BUREAU OF HYGIENE AND TROPICAL DISEASES.

TROPICAL VETERINARY BULLETIN.

VOL. 14.] November 30, 1926. [No. 4.

DISEASES DUE TO PROTOZOAN PARASITES.

VAN SACEGHEM (R.). **Propagation de *Theileria parva* par les tiques.** [The Spread of *Theileria parva* by Ticks.]—*Bull. Méd. Katanga.* 1925. Oct. Vol. 2. No. 5. p. 213.

East Coast fever is endemic in the Ruanda Urundi area, and the mortality among calves amounts to about 25 per cent. Adult animals are more or less immune as a result of infection during early life.

The disease does not appear to occur at altitudes of 2,000 metres, although ticks are present but in small numbers. van Saceghem believes that the lower temperature at high altitudes has an attenuating effect upon the parasite. When animals born on the higher ground are brought down they contract the disease at about 1,500 metres, and adults die.

WITKAMP (J.). **Onderzoek naar het bestaan van een toestand van labiele infectie ten opzichte naar piroplasmosis canis bij inheemsche honden.** [Latent Infection of Native Dogs with *B. canis*.]—*Ned.-Ind. Blad. v. Diergeneesk.* 1925. Aug. Vol. 37. No. 4. pp. 385–392.

From observations Witkamp concluded that canine piroplasmosis is endemic in the Buitenzorg and other districts of Java, and that most of the native dogs are "salted," and harbour latent infection. To prove this he performed splenectomy on a number of native dogs, and examined the blood carefully. In some cases parasites were seen only after prolonged examinations over several days, and he considers that some of the cases recorded as negative may have been positive. Out of 10 dogs, 6 were shown to be infected; piroplasms appeared in one case only 24 hours after the operation, but in the other cases the interval was about two days.

One dog died from trypanosomiasis on the fourth day, and appears to have been suffering from chronic surra, although (like the others) it appeared healthy before splenectomy was performed.*

*Summarized by Dr. W. H. Andrews.

(K3096) Wt P.14/216 700 11/26 H & Sp Gp 52

CONTIS (Georg). **Beitrag zur Hundepiroplasmose in Griechenland.** [Canine Piroplasmosis in Greece.]—*Berlin. Tierärzt. Woch.* 1926. May 7. Vol. 42. No. 19. pp. 314–316.

The author gives an account of nine cases of piroplasmosis encountered in his practice during the course of 6 months.

The dogs were treated with 10 to 20 cc. of 1 per cent. trypanblue and recovery took place in all cases but one in which treatment was given on the eighteenth day of illness.

The anaemia persisted for about 3 months.

SERGENT (Edm.), DONATIEN (A.), PARROT (L.), LESTOQUARD (F.), & PLANTUREUX (E.). **Des piroplasmes bovins du S.G.** *Babesiella.* **Description d'une nouvelle espèce** *B. major* **(origine : France).** [A New Babesiella, *B. major* of Bovines in France.]—*Ann. Inst. Pasteur.* 1926. July. Vol. 40. No. 7. pp. 582–594. With 1 chart & 1 text fig.

The observations recorded in this paper were carried out in Algeria, but both the calf in which the organism was detected and those used for experimental inoculation were recent importations from France.

Seven animals were used for experimental transmissions, and in only one of these, namely, the first passage, was any elevation of temperature noted. This was recorded on the 8th day and lasted for one day only. It cannot be stated definitely that it was caused by the parasite.

In the experimental animals the period of incubation ranged from 4 to 11 days, with an average of 7. In the sixth calf of the series no parasites were found in the blood until the 30th day, but it is considered that this was probably in the nature of a relapse, the primary invasion having escaped detection. The parasites persisted in the blood for periods ranging from 1 to 11 days, with an average of 6.

The details given regarding the extent to which the blood is invaded appear to contain an error, since it is stated that the invasion varies from 1 to 30 per 1,000 corpuscles, and the average is given as 9 per cent.

Blood changes are slight, and only a temporary anisocytosis has been observed. The parasite appears to be devoid of pathogenic powers.

As observed in the blood rather more than 50 per cent. of the parasites are round, or approximate to round. Nearly 40 per cent. are elongated, and the remainder have a trefoil shape. A single corpuscle may contain from 1 to 3 round forms. In one case 5 elongated forms were found in a single corpuscle. In some cases twin parasites were found joined together at their narrower end by a filament and forming approximately a right angle. About 50 per cent. of the elongated parasites were pear-shaped. The average size was $2{\cdot}7\mu$ by $1{\cdot}6\mu$.

The trefoil and even quatrefoil forms resembled those described by the authors as occurring in *B. berbera.*

Trypanblue was found to be without effect upon the parasite.

In only one case were parasites found at the margin of the corpuscle.

It would appear that the organism is quite distinct from *B. bovis.* Cross-immunity tests afforded evidence that the parasite was specific.

BRITISH MUSEUM

NIESCHULZ (Otto). **Zoologische bijdragen tot het Surraprobleem. III. Overbrengingsproeven met** *Tabanus rubidus* **Wied.,** *T. striatus* **Fabr., en** *Stomoxys calcitrans* **L.** [Biological Contributions to the Surra Problem. III. Transmission Experiments with *Tabanus rubidus*, *T. striatus*, and *Stomoxys calcitrans*.]—*Nederl.-Ind. Blad. v. Diergeneesk.* 1926. June. Vol. 38. No. 3. pp. 255–279. With 1 plate.

The author gives an account of his experiments in which flies belonging to the three species referred to in the title were fed upon infected buffaloes or horses and after varying periods were transferred to horses at different intervals. The tabular statement shows the essential details of the tests and the results:—

Expt. No.	Species of Fly and Number used.	Infecting animal.	Feed interrupted. After.	Feed interrupted. For.	Test animal.	Result.
1 ...	*T. rubidus* 2	Horse	3 min.	1–2 min.	Horse	+
2 ...	,, 5	Buffalo	3 ,,	1–10 ,,	,,	—
3 ...	,, 20	,,	3 ,,	1–3 ,,	,,	+
4 ...	,, 101	,,	3 ,,	1–7 ,,	,,	—
5 ...	,, 7	Horse	3 ,,	30–35 ,,	,,	+
6 ...	,, 100	,,	3–5 ,,	8–15 hours	,,	—
7 ...	,, 119	,,	10 ,,	1–3 days	,,	+
8 ...	,, 97	,,	10 ,,	1 ,,	,,	—
9 ...	,, 97	,,	10 ,,	2 ,,	,,	—
10 ...	,, 97	,,	10 ,,	3 ,,	,,	—
11 ...	,, 6	,,	Not.	3–30 ,,	,,	—
12 ...	*T. striatus* 1	,,	3 min.	2 min.	,,	+
13 ...	,, 3	Buffalo	3 ,,	4–8 ,,	,,	—
14 ...	,, 25	Horse	3 ,,	28–36 ,,	,,	+
15 ...	,, 102	,,	3–5 ,,	8–15 hours	,,	—
16 ...	,, 8	,,	Not.	1–8 days	,,	—
17 ...	*Stomoxys* 100	,,	3 min.	1–11 min.	,,	—
18 ...	,, 100	,,	3 ,,	26–37 ,,	,,	—

In the table where more than one period is given for the interval between the two feeds it means that some of the flies of the batch were used for each period.

FABRE (H.) & BERNARD (M.). **Sur un nouveau foyer de trypanosomiase bovine observé à la Guadeloupe.** [A New Centre of Bovine Trypanosomiasis in Guadeloupe.]—*Bull. Soc. Path. Exot.* 1926. June 9. Vol. 19. No. 6. pp. 435–437.

A score of bovines at Blanchon, Guadeloupe, developed symptoms which were not recognized as indicating any of the diseases of cattle commonly encountered. There were observed anaemia, muscular atrophy of the hind quarters, and subsequently paralysis and death. The appetite and rumination were normal. In some of the animals lachrymation was noticed, but there was little or no oedema in any instance. It was thought that piroplasmosis was responsible, but blood examination immediately revealed the presence of trypanosomes in large numbers. A number of the animals died. The trypanosome has not been identified, but it is described as very active in the blood, the centrosome is at the posterior extremity, the free flagellum is short and the undulating membrane not very well developed.

An unidentified blood-sucking fly is suspected as being the transmitting agent, but specimens of it have not been caught and examined.

In a note MESNIL states that the parasite appears to resemble *T. cazalboui* (*T. vivax*).

BAROTTE (J.). **Prophylaxie de la dourine. Réaction de fixation et chimiothérapie.** [Dourine Prophylaxis. Complement Fixation and Chemotherapy.]—*Bull. Soc. Path. Exot.* 1926. May 12. Vol. 19. No. 5. pp. 325–330.

The author thinks that the doubtful results which have been obtained with the complement fixation tests in the diagnosis of dourine in asses and mules is due to insufficient preliminary heating of the serum. He insists that the serum must be heated to 60–62°C. for not less than half an hour, as otherwise the anticomplementary properties of the sera are not destroyed.

He believes that the antigen prepared according to the technique described by WATSON is not sufficiently stable and homogeneous. He prefers an alcohol-ether antigen, prepared from dried trypanosomes after they have been ground up. The technique used originally in the test was that of CALMETTE and MASSOL, but more recently BESREDKA'S technique, devised for the diagnosis of tuberculosis, has been employed in preference.

"Bayer 205" and 309 of Fourneau have been tested, but neither has given results superior to those obtained by atoxyl and tartar emetic in combination. Relapses have occurred within a week or a fortnight, and treatment has been unsuccessful when it has been delayed. Furthermore, it would appear that in equines the safety factors of "Bayer 205" and "Fourneau 309" are smaller than they are in man.

KLIGLER (I. J.) & WEITZMAN (I.). **Susceptibility and Resistance to Trypanosome Infections. I. Attempts at Immunization with Dead and Attenuated Trypanosomes.**—*Ann. Trop. Med. & Parasit.* 1926. June 24. Vol. 20. No. 2. pp. 147–160.

The aim of the authors' investigations is to throw light upon the mechanism of immunity to protozoal infections. That such an immunity exists in, for example, the case of malaria, there is considerable field evidence to show. The immunity conferred by an attack is, however, not readily investigated on account of specific affinity of the malarial plasmodium for human hosts. In their experiments, therefore, they have used trypanosomes pathogenic for laboratory animals. The trypanosome selected was *T. evansi* isolated from mules, and the animal used was the rabbit.

In a previous publication the authors showed that it is not generally possible to demonstrate humoral parasiticidal antibodies, that there is a definite change in the leucocyte picture during the disease, that by disturbing the leucocyte balance by means of olive oil injections relapses can be produced at will, and that "Bayer 205" treated animals acquire a more or less durable resistance to re-infection. They concluded from their previous work that destruction of trypanosomes in the circulation led to a partial immunization, which in turn led to a disappearance of parasites from the circulation.

The experiments recorded in the present communication had for their object the production of changes simulating those occurring during infection, and an increase in resistance of the host by the injection of dead or attenuated parasites. The index of host resistance was gauged by the interval elapsing between inoculation and the appearance of trypanosomes in the blood.

In blood examinations thick drops stained with Giemsa were used, and the relative intensity of infection was judged by the number of trypanosomes per field. An occasional parasite (less than one in 20 fields) was not considered as indicating blood invasion.

In the first experiments recorded rabbits were injected with washings from sedimented trypanosomes or autolysed trypanosomes (by freezing and thawing). Three doses were given at 5-day intervals. Rabbits so treated showed shorter incubation periods than controls.

Animals given repeated (25) injections of washed trypanosomes killed by heat at 56° C. showed still shorter periods of incubation than those treated with washings or autolysed parasites. In fact, the onset of infection when living trypanosomes were given was so to speak explosive. Subsequently the disease followed the usual or a possibly milder course.

Repeated experiments showed that no difference resulted whether the citrated blood was allowed to stand for some time before the trypanosomes were collected or whether the whole process of centrifuging and killing was carried out at once. By reducing the number of injections of dead trypanosomes to 10 it was found that the course of infection in injected animals ran parallel with that in control animals.

Autolysed or dead trypanosomes therefore appeared to render the animals hypersensitive to infection, in that the period of incubation was reduced.

In animals subjected to a long series (25) of injections of trypanosomes killed by heat, marked swelling and oedema developed.

The immediate effect of injections, whether of trypanosomes, serum, or autolysed trypanosomes, was a rise in the number of polynuclear leucocytes, and this was followed by a fall associated with a proportional increase in lymphocytes. But control injections indicated that this was not a specific reaction.

Attention was next turned to the possibility of producing some degree of immunity by injecting trypanosomes together with "Bayer 205."

Trypanosomes were collected from citrated guineapig blood by fractional centrifuging, and autolysed by freezing and thawing. Half the material obtained was injected into a rabbit direct and the other half was mixed with a solution of "Bayer 205" and injected after an interval of half an hour at room temperature. A control rabbit was given an equivalent amount of the drug without trypanosomes. The amount injected, ·005 g. per kilo, had previously been found to be insufficient to confer any protection.

The results were that the animal receiving trypanosomes only had an explosive infection, the one receiving "Bayer 205" only developed a fatal infection after a period of incubation of 10 days, and the third, which received the mixture, gave a blood picture suggesting that infection was about to develop, but it recovered without becoming infected. The resistance was of short duration, because the animal succumbed later to a test inoculation.

Experiments on similar lines were repeated using different amounts of the drug, but generally speaking the results were in agreement in that the mixture of " Bayer 205 " and trypanosomes conferred some degree of resistance.

ARCHIBALD (R. G.) & RIDING (D.). **A Second Case of Sleeping Sickness in the Sudan caused by** *Trypanosoma rhodesiense.*—*Ann. Trop. Med. & Parasit.* 1926. June 24. Vol. 20. No. 2. pp. 161–166. With 1 map in text.

The case occurred in a boy 15 years of age, in the Tembura district of Bahr-el-Ghazal—where *G. morsitans* is plentiful. The clinical history of the case resembled that of *T. rhodesiense* infection in man, rats inoculated showed a high percentage of posterior nuclear forms, and the pathogenicity of the parasite for laboratory animals closely resembled that of *T. rhodesiense.*

VAN SACEGHEM (R.). **Le bismuthoidol dans le traitement des trypanosomiases animales.** [Bismuthoidol in Treatment of Animal Trypanosomiases.]—*Bull. Méd. Katanga.* 1925. Oct. Vol. 2. No. 5. pp. 243–246.

Bismuthoidol is colloidal bismuth in isotonic sugar solution.

A few experiments have been carried out, using the intravenous path. It is concluded from these that the drug has no action upon *T. congolense*, but that it has a marked trypanocidal action upon *T. brucei.*

KELLERSBERGER (E. R.). **" Bayer 205 " dans la maladie du sommeil. Considérations sur 105 cas traités.** [" Bayer 205 " in Sleeping Sickness. 105 Treated Cases.]—*Bull. Méd. Katanga.* 1926. Feb. Vol. 3. No. 1. pp. 3–16.

As a result of his observations on 105 cases of sleeping sickness treated with " Bayer 205 " the author concludes that it is effective before the nervous system is involved, provided the injections are given at sufficiently short intervals. It achieves only a temporary clearance of the circulation if it is used after the central nervous system has been invaded. It does not influence the cellular contents of the cerebro-spinal fluid in such cases.

LAGAS (D.). **Over de toepassing van Bayer 205 als hulpmiddel bij de bestrijding van surra bij karbouwen in de Onderafdeeling Samosir der Batakeanden.** [The Use of " Bayer 205 " for the Control of Surra in Buffaloes in the Samosir District, Sumatra.]—*Nederl.-Ind. Blad. v. Diergeneesk. en Dierenteelt.* 1926. Apr. Vol. 38 No. 2. pp. 192–203. With 5 tables.

During the period October 1924 to April 1925, 811 buffaloes were treated prophylactically with " Bayer 205." Sixty-four of these were apparently healthy carriers, 94 showed more or less marked clinical symptoms, and 42 were clinical cases in which the trypanosome could be found.

During the period mentioned, 49 of the treated buffaloes died from various causes, and nine animals were found showing trypanosomes

in their blood. The intervals elapsing between appearances ranged from 3 weeks to 10 months, but on an average the period was 2 months.

Eight animals, which received a second dose of " Bayer 205 " of from 2 to 4 grammes, have not, up to the present, shown relapses. Buffaloes outside the affected areas were given small doses for protective purposes, and this was found to be economically advantageous, as a larger number of animals were by this means prevented from becoming a means of spread of the disease.

It was confirmed that in order to put up a successful fight against the disease a large proportion of the animals in infected areas would have to be injected.

It was a generally held opinion that the treated animals improved in condition.

It is advised that for full grown animals the dose be raised from 2 to 3 grammes.

KEEVILL (A.). **The Treatment of Sleeping Sickness** (*Trypanosoma rhodesiense*)—**a Study of Fifty Cases.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1926. Mar. 18 & May 20. Vol. 20. Nos. 1 & 2. pp. 111–118.

The author gives details and tabular statements of his cases and from these draws the following conclusions :—

Tryparsamide fails to sterilize either the blood or the spinal fluid in cases of *T. rhodesiense* infection. " Bayer 205," on the other hand, causes a disappearance of trypanosomes both from the blood and spinal fluid, and as a rule causes a prompt improvement in general condition.

Tryparsamide is of particular value in those cases which have relapsed after treatment with ' Bayer 205 " or, better, for the subsequent treatment of all cases in which the spinal fluid does not become normal.

Treatment with tryparsamide should be delayed at least ten weeks after treatment with " Bayer 205," otherwise there is a great risk of visual disturbance or blindness.

The immediate results obtained with Fourneau, Tréfouel and Vallée's 309 are at least as good as those obtained with " Bayer 205."

DYE (William H.). **The Serum-Formalin Reaction in** *Trypanosoma rhodesiense* **Infection.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1926. Mar. 18 & May 20. Vol. 20. Nos. 1 & 2. pp. 74–92. With 2 text figs.

An account is given of an outbreak of human trypanosomiasis which was due to *T. rhodesiense*. The specific diagnosis was based upon the facts that short and posterior-nuclear forms were found in inoculated rats, and that the local species of fly was *G. morsitans*. A few specimens of *G. pallidipes* were found; but no specimens of *G. palpalis* occurred among the many thousands of flies collected.

In addition to observations on the serum-formalin reaction the paper contains accounts of cases treated with " Bayer 205 " and tryparsamide.

The evidence regarding the outbreak itself indicated that the disease was endemic in the particular area, and had been so for many years.

It also appeared to indicate that the infection which was of comparatively feeble virulence was spread direct from man to man.

"Bayer 205" appeared to be markedly more effective than tryparsamide for clearing the circulation, but the most marked improvement in treatment, which was shown by rapid convalescence and return to normal, occurred in those cases which were treated first with "Bayer 205" and subsequently with tryparsamide.

It was noted that just as the number of trypanosomes present in the peripheral blood is no indication of the severity of the disease, so the severity of the blood invasion did not materially influence the degree of reaction obtained with the serum-formalin reaction. In carrying out the test 1 minim of formalin was added to 1 cc. of serum, and the results were read at periods ranging from 30 minutes to 24 hours, the degree of solidification being noted at each reading.

It was noted that if the serum were made hypertonic by the addition of salt, the reaction was accelerated, but the addition of salt to a normal serum did not cause it to give the reaction.

The addition of $\frac{1}{4}$ grain of "Bayer 205" to the serum an hour before the formalin was added greatly retarded the reaction.

The addition of the same, or double the amount of tryparsamide to the serum, did not influence the speed of the reaction at all.

The cerebro-spinal liquid did not give the reaction.

As to the value of the method, the author comes to the conclusion that while it is to some extent disappointing, it has some value.

A negative result in an untreated case is of undoubted value. The value of a positive result in an untreated case may be confirmed by giving three 1 gramme injections of "Bayer 205." If the case is one of trypanosomiasis the injection of the drug will alter the intensity of the reaction.

The results of treatment recorded differ markedly from those obtained in *T. gambiense* infection, and the author points out that it would be interesting to get results of the serum-formalin reaction of such patients, as well as those of local mammals.

Experiments carried out by the author with the blood of animals in his area, some of which were infected with trypanosomes (supposedly *T. brucei*), yielded results parallel with those given with the blood of his patients.

From this it would appear that the difference between *T. brucei* and *T. rhodesiense*, if there is any at all, is slight.

MAZZA (Salvador). **Existencia de la leishmaniosis cutánea en el perro en la República Argentina. (Nota preliminar).** [Cutaneous Leishmaniasis in Argentine Dogs.]—*Bol. Inst. Clin. Quirúrgica.* Buenos Aires. 1926. Apr. No. 11. 5 pp. With 1 text fig.

Cutaneous leishmaniasis has been known to exist amongst dogs in Persia and Turkestan for some years. The author found several cases in the Argentine. The lesion was often situated at the root of the ear, but was also present elsewhere. He never found any leishmanial infection of the mucosae, and splenic puncture in life, and examination of the liver, spleen and bone-marrow after death failed to reveal any involvement of these tissues.*

* Summarized by Dr. H. Harold Scott.

ADLER (S.) & THEODOR (O.). **Further Observations on the Transmission of Cutaneous Leishmaniasis to Man from** *Phlebotomus papatasii.*—*Ann. Trop. Med. & Parasit.* 1926. June 24. Vol. 20. No. 2. pp. 175–194. With 3 plates.

Systematic examination of sandflies in Jericho during 1925 showed that approximately 1 per 1,000 were infected with Herpetomonas. Nearly 4,000 flies were examined, of which the great majority were females of *P. papatasii.*

During the period 1924–25 seven infected flies were found, and of these, four contained mammalian blood and three no recognizable blood.

In stained preparations the Herpetomonas show great polymorphism, and it appeared to be possible to make two groups of them—flagellated and non-flagellated. Details of both forms are given and a plate shows their morphology.

In the flies containing mammalian blood the majority of the parasites were found in the stomach. In the other three they were in the oesophagus, oesophageal diverticulum, and both portions of the gut. In two out of three cases volunteers were successfully inoculated with material from the flies.

Sand-flies were fed upon oriental sores and 10 per cent. acquired herpetomonas.

Eleven attempts were made to infect volunteers with material from sand-flies artificially infected with Herpetomonas, but all remained negative during observation of three and a half months.

PUPO (J. Aguiar). **Traitement de la leishmaniose des muqueuses par l'éparséno (amino-arséno-phénol de Pomaret). Ses possibilités d'emploi dans le traitement du kala-azar.** [The Treatment of Leishmaniasis of Mucous Membranes with Éparseno. The Possibilities of treating Kala Azar with it.]—*Bull. Soc. Path. Exot.* 1926. May. Vol. 19. No. 5. pp. 331–335.

The author gives details of three cases treated and finds amino-arseno-phenol Pomaret superior to 606 and 914.

TANABE (Misao). **The Cultivation of Trichomonads from Man, Rat and Owl.**—*Jl. Parasit.* 1925. Dec. Vol. 12. No. 2. pp. 101–104.

The composition of the culture medium used is as follows :—

Sodium chloride	0·7 g.
Sodium citrate	1·0 g.
Loeffler's blood serum (dehydrated) ...	0·5 g.
White of egg	2 cc.
Distilled water	100 cc.

The salts are first dissolved in the water, then the egg with vigorous shaking, and finally the blood serum.

This medium does not readily become heavily invaded by bacteria, and trichomonas cultures can be carried on by subinoculating every three days. Incubation is at 35° C.

The most favourable reaction was pH 8·0 to 8·2.

NIESCHULZ (O. C. H.). **Die Kokzidiose beim Geflügel und bei Kaninchen.** [Coccidiosis in Birds and Rabbits.]—*Deut. Tierärzt. Woch.* 1926. May. Vol. 34. No. 19. pp. 352–353. With 1 text fig.

This brief paper gives the life cycle of coccidium. It appears to have been read at a meeting of laymen interested in breeding birds and rabbits.

i. YAKIMOFF (W. L.) & MARKOFF-PETRASCHEWSKY (E. N.). **Modifications du sang au cours de la coccidiose des animaux. I. Le sang au cours de la coccidiose bovine.** [Alterations in the Blood of Animals infected with Coccidiosis. I. Bovine Animals.]—*Bull. Soc. Path. Exot.* 1926. June 9. Vol. 19. No. 6. pp. 427–428.

ii. YAKIMOFF (W. L.) & DAWYDOFF (A. M.). **II. Le sang au cours de la coccidiose des rats blancs.** [II. White Rats.]—*Ibid.* pp. 428–429.

i. The authors find that the eosinophiles are increased in number, and that the increase is in proportion to the age of the animals.

ii. In white rats heavily infected with coccidia the authors find a decrease in the number of neutrophile polynuclears and an increase in the lymphocytes and eosinophiles.

CATANÉI (A.) & PARROT (L.). **Sur le virus de la spirochétose aviaire en Algérie et sur la longue durée de sa conservation chez** *Argas persicus*. [Algerian Avian Spirochaetosis and its Preservation in *Argas persicus*.]—*Bull. Soc. Path. Exot.* 1926. June 9. Vol. 19. No. 6. pp. 419–421.

Cross tests go to show that the spirochaetosis of birds in Algeria is the same as that described by MARCHOUX & SALIMBENI in Brazil.

In 1920 the authors detected a case of spirochaetosis in a duck. Tests have shown that although it was at first thought that this was a distinct species, it is in all probability identical with the fowl type of parasite. On March 8th 1926 the authors ground up about a score of adult *Argas persicus* which had been collected at Biskra on March 22nd 1924. The ticks had been kept at room temperature throughout the period except that they were incubated at body temperature for the last five days before they were used for the inoculation of a young fowl. Spirochaetosis developed.

SEDDON (H. R.). **A Note on Spirochaetosis in Fowls.**—*New South Wales Dept. Agric. Vet. Research. Rept.* No. 2. 1926. Apr. pp. 17–19.

The existence of spirochaetosis was established and argas ticks were collected. Susceptible birds were infected by contact in 3 to 4 weeks after contact. It was noteworthy that the attacks were mild and that spirochaetes were found to be present in the blood for a few days only, when obvious symptoms of illness were present.

MATHIS (C.) & GUILLET (R.). **Réceptivité du lapin au spirochète de la Musaraigne.** [The Susceptibility of the Rabbit to the Spirochaete of the Shrew Mouse.]—*Bull. Soc. Path. Exot.* 1926. June 9. Vol. 19. No. 6. pp. 504–507.

LEGER in 1917 expressed the opinion that the spirochaete of the shrew—*S. crocidurae*—was not transmissible to the rabbit. The authors find, however, that it is capable of setting up a slight transitory infection.

MAZZA (Salvador). **Sobre una espiroqueta encontrada en un perro de Tabacal (Salta). (Nota preliminar.)** [A Spirochaete found in a Dog at Tabacal (Salta).]—*Bol. Inst. Clin. Quirúrgica.* Buenos Aires. 1926. Apr. No. 11. 6 pp. With 5 figs.

The author, in the course of examination of dogs in Tabacal for filarial infection, found certain spirochaetes, particularly abundant in smears and sections from the spleen and liver, present also, but in smaller numbers, in the kidneys and lungs. The average length was 7·7 microns, the limits being 6 and 9·2 microns, and the thickness 0·2–0·35 microns; the average number of turns was 6, but they varied between 4 and 9. They differ in size from those previously described under the names of *Sp. canis* and *Sp. regaudi*, and the author, from the locality where it was found, gives it the name of *Treponema tabacalensis* [*sic*] n. sp.*

LEVADITI (C.), NICOLAU (S.), SCHOEN (R.), GIRARD (M. A.) & MANIN (Y.). **Mode de résorption et mécanisme d'action du bismuth dans la syphilis expérimentale.** [The Resorption of Bismuth and the Mechanism of its Action in Experimental Syphilis.]—*Ann. Inst. Pasteur.* 1926. July. Vol. 40. No. 7. pp. 541–573. With 20 text figs.

MAZZA (Salvador). **Observación de infección espontánea del perro por el *Schizotrypanum cruzi*.** [Spontaneous Infection with Schizotrypanum cruzi in the Dog.]—*Bol. Inst. Clin. Quirúrgica.* Buenos Aires. 1926. Apr. No. 11. 7 pp. with 4 figs.

DISEASES DUE TO METAZOAN PARASITES.

BAYLIS (H. A.), SHEATHER (A. L.) & ANDREWS (W. H.). **Further Experiments with the *Gongylonema* of Cattle.**—*Jl. Trop. Med. & Hyg.* 1926. July 1. Vol. 29. No. 13. pp. 194–196.

The experiments recorded in this paper were undertaken with a view to determining, if possible, whether *Gongylonema scutatum* of cattle can be transmitted to other hosts.

A calf, a sheep, and a pig were fed with specimens of the small cockroach, *Blattella germanica*, experimentally infected with the larvae of bovine gongylonema in Italy. One sheep and one pig were fed with dung beetles collected from cow dung at Villa Lagarina, Trentino. A control sheep and a control pig were kept. The three sheep were kept in a loose-box together throughout the experiment. The pigs after the first few days were penned separately for the purpose of facilitating the collection of faeces for examination as to the presence of eggs.

---

* Summarized by Dr. H. Harold Scott.

The calf when killed was found to have 80 worms in the oesophagus. Both sheep were also infected showing 46 and 15 adult Gongylonema respectively. No parasites were found in the oesophagus of either of the pigs. The control sheep was negative, and the control pig was not killed as the experimental ones were negative. It may be noted that although the faeces were examined on a number of occasions by the sugar flotation technique, no eggs of Gongylonema were found. On a number of occasions the sediment was also examined, but with negative results.

BAYLIS (H. A.). **A New Species of Hepaticola (Nematoda) from the Rat's Stomach.**—*Jl. Trop. Med. & Hyg.* 1926. Aug. 2. Vol. 29. No. 15. pp. 226–227. With 2 text figs.

The author describes *Hepaticola gastrica* n. sp. which he found in the epithelial layer of the cardiac portion of the stomach of rats from Bologna and Villa Lagarina. He believes the worms collected by WASSINK in Holland and by FIBIGER in Denmark belong to the same species. The principal points upon which the separation of the species from *Hepaticola hepatica* rests are the differences to be observed in the eggs and the difference in location.

GOODEY (T.). **On the Ascaris from Sheep.**—*Jl. Helminth.* 1926. Mar. Vol. 4. No. 1. pp. 1–6. With 3 text figs.

The author gives reasons for maintaining that the Ascaris of the sheep is *Ascaris lumbricoides*. The list of hosts for this parasite therefore is at present as follows: Man, chimpanzee, orang-outang, pig, sheep, cattle and squirrels.

O'BRIEN (H. R.). **Hookworm Control with Chenopodium-Carbon Tetrachloride.**—*Jl. Trop. Med. & Hyg.* 1926. Aug. 2. Vol. 29. No. 15. pp. 227–229.

In this paper the author records the treatment of more than 225,000 individuals. Only three deaths occurred, but these were not connected with the treatment.

The maximum dose was 2 cc. of a mixture containing 40 per cent. oil of chenopodium and 60 per cent. carbon tetrachloride [by volume].

The routine was:—

1. No breakfast was given.
2. 7 a.m. 1 cc. of the mixture.
3. 8 a.m. 1 cc. of the mixture.
4. 9 a.m. 1 ounce of magnesium sulphate in hot water.
5. Instructed to take no food until the bowels had moved.

The actual results of the treatment are not stated.

BLACKLOCK (D. B.). **The Further Development of *Onchocerca volvulus* Leuckart in *Simulium damnosum* Theob.**—*Ann. Trop. Med. & Parasit.* 1926. June 24. Vol. 20. No. 2. pp. 203–218. With 1 text fig. & 1 plate.

Larvae of *O. volvulus* taken up by *S. damnosum* undergo development in the fly and finally reach the proboscis. The shortest period observed for this process was seven days.

MAZZA (Salvador) & ROSENBUSCH (Francisco). **Sobre una microfilaria sp. de los perros del norte de la República. (Nota preliminar.)** [Filarial Embryos in Dogs of the Northern Argentine.]—*Bol. Inst. Clin. Quirúrgica.* Buenos Aires. 1926. Apr. No. 11. 5 pp. With 1 plate.

The authors examined 55 dogs and found filarial embryos in considerable numbers in the peripheral blood of 19 of them. These embryos were unsheathed, had an average length of 200 microns, varying between 182 and 262 microns. The average internal measurements, starting from the anterior extremity, are given as follows: Nerve ring 47·9, excretory pore 68·5, excretory cell 74·5, anal pore 158·5, caudal cell 195·6 microns. They differ from the embryos of *Dirofilaria immitis*, *F. repens*, *F. recondita*, and *F. Ochmani* in the measurements.

Except for the presence of one in the lungs, they did not discover any in the viscera, and a rigid search of all the tissues proved negative as regards the adult worm. Affected dogs were emaciated.*

SYMONS (T. H.). **A Case of *Spirocerca sanguinolenta* in a Foxhound.**—*Vet. Jl.* 1926. Sept. Vol. 82. No. 9. pp. 472–475.

The case here recorded was one of obscure illness occurring in a bitch belonging to the Madras Hunt. Tick fever (*P. gibsoni*) was excluded. No evidence of tuberculosis could be obtained. Worm eggs were not found, but the animal continued to lose condition. It was finally decided to destroy her.

Just before chloroform was administered, faeces were passed. These, to begin with, were sloppy and cream coloured, but the last part of the motion was covered, externally only, with blood.

The oesophagus, in the thoracic portion, showed a tumour like mass the size of a walnut, from which 32 specimens of *Spirocerca sanguinolenta* were obtained. There was also chronic venous congestion of the liver and interstitial nephritis and the spleen showed a scar indicating an old rupture.

PILLERS (A. N.). *Fasciola hepatica* **in the Wild Rabbit in England.**—*Ann. Trop. Med. & Parasit.* 1926. June 24. Vol. 20. No. 2. p. 219.

Pillers records the presence of 38, 33, and 22 adult flukes, which were found to be morphologically similar to *Fasciola hepatica*, in the livers of three wild rabbits. Sheep had not had access to the land upon which the rabbits were for over seven years, and the disease had not been recognized in any farm animals in the surrounding district. The affected rabbits appeared to be confined to a particular belt of land, those on either side being unaffected.

MCKAY (A. C.). **A Note on the Intermediate Host or Hosts of *Fasciola hepatica* in New South Wales.**—*Med. Jl. Australia.* 1926. Mar. 13. 13th Year. Vol. 1. No. 11. p. 300.

The author produces evidence to show that *Limnaea brazieri* is an intermediate host of *Fasciola hepatica* in New South Wales.

* Summarized by Dr. H. Harold Scott.

CAWSTON (F. G.). **The Problem of the Rhodesian Fluke-Carriers.**—*Rhodesian Agric. Jl.* 1926. Apr. Vol. 23. No. 4. pp. 347–348. With 1 plate.

The author states that HORNBY has informed him that he has collected numerous cercaria-carriers among Rhodesian snails, but that so far it is not possible to state which species is responsible for the spread of fluke disease in Southern Rhodesia.

The presence of *Limnaea natalensis* or *L. truncatula* must be considered as a possible source of danger.

On fluke-infested farms the methods of keeping the carriers within limits include *burning* the rushes during the dry season, as the products of burnt rushes are detrimental to the growth of those snails which live in shallow water ; *complete drying* of pools for short periods, lime and sulphate of copper, and the introduction of the domestic duck.

NORRIS (J. H.). **The Control of Liver Fluke Disease in Sheep and Cattle.**—*National Vet. Med. Assoc. Great Britain and Ireland. Ann. Congress.* 1926. Programme. pp. 111–161.

The worst seasons for fluke infestations occur after a wet summer following a mild winter. It is doubtful if even very prolonged drought would cause the disease to die out, but a hard winter followed by a dry summer reduces the incidence of the disease.

In view of the life-history of the parasite measures for control of the disease fall into two categories : (1) The destruction of the flukes in the livers of infested animals ; (2) the destruction of the intermediate host.

The bulk of the paper is devoted to an account of experimental work carried out with carbon tetrachloride and male fern extract. The author emphasizes the necessity of careful attention and good food.

Extract of male fern of good quality is a satisfactory anthelmintic for adult flukes, but it fails to destroy the immature ones. This can be overcome by repeated dosing. The objections to the drug are that it is difficult to get a standard extract at a reasonable price, and it is toxic in relatively small doses.

Carbon tetrachloride is superior to male fern. It has proved to be completely effective against adult flukes, it is very much cheaper, there is a far wider margin of safety, single doses are effective, there is no absolute necessity of weighing the animals for the graduation of the dose, and it is not necessary to fast beforehand.

HUNG (See-Lü). **A New Species of Fluke** *Parametorchis noveboracensis*, **from the Cat in the United States.**—*Proc. U. S. Nat. Museum.* 1926. Vol. 69. Art. 1. 2 pp. With 1 text fig.

The author figures and describes a fluke found in the gall-bladder of the domestic cat in New York. Only three specimens were available for examination.

CAMERON (T. W. M.). **Observations on the Genus** *Echinococcus* **Rudolphi, 1801.**—*Jl. Helminth.* 1926. Mar. Vol. 4. No. 1. pp. 13–22. With 2 text figs.

The author is unable to accept the view that Taenia, Taeniorhynchus, and Multiceps are valid genera. He holds that they should all be

referred to the genus *Taenia*. The genus *Echinococcus* is a valid one, and the type is *E. granulosus* (Batsch, 1786). This genus includes also *E. oligarthrus* Diesing 1863. This species is figured and described.

E. longimanubrius, n. sp., from the Cape hunting dog (*Lycaon capensis*) closely resembles *E. granulosus*, but there are marked differences in the hooks.

E. minimus n. sp. has been collected from *Canis lupus* in Macedonia.

MILLZNER (Theresa Marie). **On the Cestode Genus Dipylidium from Cats and Dogs.**—*University of California Publications in Zoology.* 1926. Vol. 28. No. 17. pp. 317–356. With 7 plates.

The author figures and describes the worms of the genus *Dipylidium* found in the course of the examination of 28 dogs and 30 cats. In all, 1,230 specimens were found, of which 3 only were *D. caninum*, all from one dog.

D. sexcoronatum formed 0·2 per cent. of the specimens obtained from dogs, and 3 per cent. of those found in cats. Five new species were created for the remainder. 74 per cent. of those from dogs and 40 per cent. of those from cats were *D. gracile* n. sp. *D. crassum* n. sp. formed 25 per cent. of the worms in dogs. *D. compactum* n. sp. formed 40 per cent. of those found in cats. *D. longulum* n. sp. and *D. diffusum* occurred in cats only and represented 10 and 7 per cent. respectively of the whole number found.

RABATEL (M. J.). **La Gale sarcoptique du Mouton au Dahomey.** [Sarcoptic Mange of the Sheep in Dahomey.]—*Rec. Méd. Vét.* 1926. May. Vol. 102. No. 9. pp. 285–287.

The author records the occurrence of sarcoptic mange among sheep along the border between Dahomey and the contiguous British territory. About 70 per cent. of the sheep are affected. Although horses, goats and dogs live in close proximity to the affected sheep, they do not contract the disease.

The disease begins round the muzzle, but however long-standing it may be, it never spreads to the body. It is confined to the bare or hair-covered parts only.

Affected animals are in poor condition, partly no doubt because of the difficulty of prehension of food, but cases never terminate fatally.

The natives take no notice of the disease, and take no steps either to prevent or to cure it.

DIEBEN (C. P. A.). **Geitenschurft.** [Goat Scab.]—*Nederl.-Indië. Blad. v. Diergeneesk. en Dierenteelt.* 1926. Apr. Vol. 38. No. 2. pp. 177–191. With 1 plate.

The author records a severe outbreak of goat scab caused by *Chorioptes caprae*.

The infection begins in most cases at the commissures of the lips, and in some cases affects the skin above the hoofs, particularly in the cleft. The nose, udder, scrotum, anus, under-side of the tail are somewhat rarely affected.

There is loss of hair and desquamation of the skin followed by thickening and wrinkling. Warty outgrowths may develop. Secondary infestations with maggots must be guarded against. In uncomplicated cases a cure is readily effected by treatment with liniment containing sulphur, tar, alcohol and soap.

BOREL (M.). **Note préliminaire sur les moustiques de Cochinchine et du Sud Annam (Massif du Langbian).** [Preliminary Note on the Mosquitos of Cochin China and Southern Annam.]—*Bull. Soc. Path. Exot.* 1926. June 9. Vol. 19. No. 6. pp. 472–479.

CAMERON (A. E.). **Bionomics of the Tabanidae (Diptera) of the Canadian Prairie.**—*Bull. Entom. Res.* 1926. July. Vol. 17. No. 1. pp. 1–42. With 5 plates & 18 text figs.

JONES (W. Norman). **A Preliminary Survey of the Nematode and Cestode Parasites of Sheep in North Wales, Oct. 1923, to Sept. 1924.**—*Jl. Helminth.* 1926. Mar. Vol. 4. No. 1. pp. 31–35.

———. **A Further Survey of the Nematode and Cestode Parasites of Sheep, Pigs, and Cattle in North Wales, Oct. 1924 to Sept. 1925.**—*Idem.* pp. 36–42.

ROSS (I. Clunies). **A Survey of the Incidence of *Echinococcus granulosus* (Batsch) or Hydatid Disease in New South Wales.**—*Jl. Austral. Vet. Assoc.* 1926. June. Vol. 2. No. 2. pp. 56–67.

WETZEL (R.). **Strongyliden der Pferde in Deutschland.** [Strongyles of Equines in Germany.]—*Deut. Tierärzt. Woch.* 1926. Aug. 28. Vol. 34. No. 35. pp. 619–625.

BACTERIAL DISEASES.

BLANC (G.) & CAMINOPETROS (J.). **Quelques expériences sur l'infection charbonneuse.** [Some Experiments with Anthrax Infection.]—*C.R. Acad. Sci.* 1926. Apr. 26. Vol. 182. No. 17. pp. 1055–1057.

In this paper the authors briefly report experiments which, they claim, show that it is not the skin which is alone susceptible to infection with anthrax as held by BESREDKA, but that the nervous system is the most susceptible.

By introducing a glass tube into the rectum of rabbits and than passing a syringe needle with rubber attachment through this the authors pierced the intestine and the sublumbar muscles and introduced a dose of virulent anthrax into the sublumbar muscles. All the animals used died of anthrax. In order to overcome objections that by this means injury to the skin was not certainly avoided, or that in piercing the tissues bacilli were allowed to escape into small vessels by which they were carried to some damaged piece of skin (as it is impossible to guarantee the perfect condition of the skin of an animal), the authors tried the following plan.

Instead of using fully virulent anthrax cultures, with which a minimal infection may cause a fatal result, they employed second vaccine which was of slightly exalted virulence resulting from numerous passages through rabbits in large doses. The strain was innocuous by subcutaneous or endermic inoculation, but produced a fatal result in

almost every case when given into the brain or transorbitally. A single experiment is recorded to show this. The rabbits inoculated intracranially or transorbitally nearly all died, and the remainder survived. The organism could be recovered from all the viscera of those that died.

It may be that the success of BESREDKA's method of vaccination is due to the fact that the skin everywhere contains nerve fibrils, but it has yet to be shown that the nervous system plays any part in immunity.

DELPY (L.). **L'infection charbonneuse et la vaccination intra-cutanée en un temps avec les vaccins pastoriens en Guinée Française.** [Anthrax and Single Dose Cutaneous Vaccination in French Guinea.]—*Bull. Soc. Path. Exot.* 1926. June 9. Vol. 19. No. 6. pp. 499–503.

Anthrax has assumed considerable importance in French Guinea since cultivation with the plough was introduced. Cases occurred only exceptionally in native animals living free in the bush, but it is of frequent occurrence among working oxen.

Over-work appears to play a part in the causation of the disease, and in the majority of cases it appears that infection is by way of the skin. Even before the introduction of the plough natives had noticed that cases of anthrax occurred only in animals showing skin wounds.

While exact observations have not been possible the field veterinary service has noted the occurrence of wounds and injuries in cattle dying of anthrax.

When, however, the disease becomes enzootic, cases occur in which no wounds can be found.

The natives of Upper Guinea habitually eat large amounts of anthrax flesh without ill effect, but it has been observed that cases occur among men engaged in porterage work when they have received injuries to the feet and legs and have eaten anthrax meat.

The difficulties associated with the classical double dose subcutaneous inoculation in a country like Guinea are well known. It was decided, therefore, to test the cuti-immunization. It was of the utmost importance that no ill effects should follow the vaccination. A beginning was made by vaccinating 25 cattle with doses of the third vaccine of the Pasteur Institute in doses of $\frac{1}{8}$ to $\frac{1}{4}$ cc., depending upon the size of the animals. A calf only three weeks old was given $\frac{1}{8}$ cc. without an ill-effect being produced. There were no accidents as a result of the vaccination and the animals were put to work the following day.

Subsequently 55 bovines belonging to natives were vaccinated without accident. Later the doses used were increased to $\frac{1}{4}$ cc. Two calves developed alarming symptoms and treatment with anti-serum was resorted to. Each received 10 cc. intravenously and subsequently 10 cc. every quarter of an hour subcutaneously. When 50 cc. had been given there was distinct evidence of improvement and both animals recovered.

In all, 5,000 animals have been vaccinated without accident and it has been found that adults will quite well withstand $\frac{1}{2}$ cc. of the second vaccine.

Sheep have been given $\frac{1}{4}$ cc. of second vaccine without ill effect.

In August 1925 a severe outbreak occurred at Kato and vaccination was begun on the 5th day. A cow which was obviously infected at

the time was treated with 200 cc. of serum only and recovered. From the second day after the vaccinations had been done no deaths occurred.

No cases of anthrax have occurred among animals vaccinated a year previously.

HRUSKA (C.). **Recherches expérimentales sur le charbon.** [Experimental Investigation of Anthrax.]—*Ann. Inst. Pasteur.* 1926. Aug. Vol. 40. No. 8. pp. 710–712.

Following BESREDKA'S views upon immunization against anthrax by the cutaneous path the author has carried out experiments with the following materials: (*a*) Broth cultures of anthrax sterilized by filtration; (*b*) broth cultures sterilized by heat at 100° C.; (*c*) a heat sterilized salt solution of extract of anthrax spleen; (*d*) Anthrax oedema heated to 96° C. for an hour; (*e*) anthrax oedema either filtered or sterilized by the addition of formalin.

No protection was obtained with any of these save the last.

BROCQ-ROUSSEU, STAUB & URBAIN. **Nouvelle technique de préparation d'un sérum anti-charbonneux. Peut-on titrer ce sérum?** [A New Method of preparing Anti-Anthrax Serum. Can this Serum be titrated?]—*Ann. Inst. Pasteur.* 1926. July. Vol. 40. No. 7. pp. 595–605.

The authors state that anti-anthrax serum prepared by their technique is not markedly superior to good sera prepared in the usual ways, but they claim that the guineapig can be used to titrate the quality of the serum. Staub and FORGEOT have shown that non-sporulating culture killed by alcohol-ether can be used for the immunization of guineapigs against the same organism.

The authors first tried this method with a horse. The animal was given on four consecutive days, by the intravenous path, 10, 20, 25 and 30 centigrammes of alcohol-ether antigen. The antigen was emulsified in normal salt solution at a strength of 1–2 milligrams per cubic centimetre. The first injections caused respiratory distress practically at once. The horse showed discomfort, pawing at the ground, and repeatedly lying down and getting up.

This series of injections was repeated a number of times. [Number not definitely stated.]

The serum from this horse, although it contained 15,000 units of antibody as shown by Calmette and Massol's method, was quite inactive. The symptoms presented by the horse clearly showed that it was susceptible to the action of the antigen.

A mare was first immunized by the process described by Brocq-Rousseu & Urbain with the two Pasteur vaccines. It was then given [interval not stated] 1 centigramme of alcohol-ether antigen intracutaneously. This was distributed at eight places on the side of the neck. During the week following this inoculation this method of inoculation was repeated. [It is not clear whether this was done daily.] Blood was withdrawn about three weeks after the first inoculation.

A month after the first inoculation four scarifications on the neck were " touched with " virulent non-sporulating culture. There was no reaction.

A fortnight later another series of inoculations were given six intravenous injections of antigen and six intradermic inoculations of virulent anthrax culture in doses ranging from 0·1 to 0·5 cc.

The serum was subsequently tested on guineapigs. It was injected intraperitoneally and culture was injected subcutaneously 48 hours later. The results are given in 12 tabular statements. The serum was found to contain agglutinins, and was very prompt in producing a precipitin reaction. It also yielded positive complement fixation tests.

It is stated that the richness of a serum in antibodies is no guide as to its protective properties.

SCOTT (J. P.). **A Comparative Study of Strains of *Clostridium chauvoei* obtained in the United States and Abroad.**—*Jl. Infect. Dis.* 1926. Mar. Vol. 38. No. 3. pp. 262–272.

Clostridium chauvoei is the primary cause of blackleg in cattle. Other anaerobes may be associated with it. *C. chauvoei* is highly pathogenic, but *C. oedematis* (Vibrion septique) is non-pathogenic. *C. chauvoei* does not produce a soluble exotoxin.

C. chauvoei ferments glucose, lactose and sucrose under favourable conditions, but vibrion septique ferments all sugars under favourable conditions, but under adverse conditions only glucose, lactose and salicin.

ROTTGARDT (Abel). **Die Milch nach Tarozzi als Nährboden und zur Differenzierung des Rauschbrandbazillus und des *Vibrio septicus* von Pasteur.** [Tarozzi Medium made with Milk for the Differentiation of the Bacillus of Blackquarter from the Vibrion Septique of Pasteur.]—*Deut. Tierärzt. Woch.* 1926. July 31. Vol. 34. No. 31. pp. 553–556.

The author finds that milk sterilized at 110° C. for 10 minutes, with the addition of pieces of cooked meat, is an excellent medium for cultivating the bacillus of blackquarter and the vibrion septique. The addition of glucose appeared to be unnecessary, although it improved the medium slightly. Gas is produced when growth takes place, and an acid reaction develops within 48 hours.

In the differential tests 32 strains of blackquarter and 9 strains of vibrion septique were used. The majority of these were obtained from the Argentine and from Germany.

The cultures of both organisms were incubated at 37° C. and were kept under observation for 35 days, and tabular statements of the results are given.

From these it appears that while coagulation of the milk in the blackquarter cultures occurs at the earliest on the third day, in the case of the vibrion septique it appears usually in 30 hours and exceptionally as late as 40 hours only.

In the case of blackquarter, the coagulation takes place slowly. It begins at the bottom of the tube and spreads upwards. The clot is soft but it never exudes a watery fluid, it never breaks up or becomes dissolved.

In the case of the vibrion septique the clotting takes place rapidly, but it is subsequently digested and liquefied to a large extent.

MIESSNER (H.) & MEYN (A.). **Vergleichende Untersuchungen über den Rinder- und Schafrauschbrand.** [Blackquarter of the Ox and Sheep. Comparative Investigations.]—*Deut. Tierärzt. Woch.* 1926. Aug. 7. Vol. 34. No. 32. pp. 571–580.

There is a very considerable literature to show that it is a commonly held view that blackquarter of the ox and sheep are one and the same disease. On the other hand, there is the striking epidemiological fact that the two diseases do not as a rule occur in the same districts.

In cattle the majority of cases occur at pasture, but they occur in the stable also, and these facts suggest that infection is due to ingestion.

In the sheep, however, cases are most frequent at lambing and shearing times, and after castration and docking. Thus the disease in the sheep would appear to be usually a wound infection.

Systematic comparative tests were therefore undertaken with a view to ascertaining whether the organisms are identical or not. Morphologically and tinctorially the organisms could not be distinguished. Nor could any difference be detected in the cultural characters of the organisms save that if ox immune serum were used for the preparation of grape-sugar-blood-agar plates the growth of organisms from a bovine source was more restricted than that of bacilli from an infected sheep. Similarly sheep anti-blackleg serum in the medium checked the growth of the sheep bacillus, but not of the bovine type of organism.

In experimental inoculations it was impossible to detect any difference in the infections caused in guineapigs, cattle, and sheep by the two types of bacilli.

Eight guineapigs were immunized with ox-blackleg-filtrate and were tested with bacilli from an ovine source. Two died of the infection, four developed severe oedema and recovered, and two failed to become infected. Of eight guineapigs treated in the reverse way, three died of blackquarter, three developed extensive oedema, and two showed no evidence of infection.

Of two guineapigs inoculated with filtrate from Martin's broth cultures of the bovine bacillus and inoculated with ovine bacilli, one died and one remained healthy. In the reverse experiment both remained healthy. In a final experiment two pairs of sheep were immunized and tested with the homologous and heterologous strains and all remained alive. Two unprotected controls died.

In spite of these results, the authors conclude that in practice it would appear to be advisable to use homologous filtrates for the immunization of the two species.

GRÄUB (E.). **Weitere Beiträge zur den Schutzimpfungen gegen den Rauschbrand mit dem Keimfreien Filtrat Gräub-Zschokke.** [Further Information regarding Protective Inoculation against Blackleg with Gräub-Zschokke Germ-Free Filtrate.]—*Schweiz. Arch. f. Tierheilk.* 1926. July. Vol. 78. No. 7. pp. 388–392.

This is a statistical paper showing results obtained during the period 1920 to 1926. Tables show the percentage of deaths among unvaccinated animals, animals vaccinated with Lyons vaccine, and those done with filtrate. The losses after the latter are very much smaller than those following the Lyons vaccine.

TUBBEHUSEN (R. E.), FITCH (C. P.) & BOYD (W. L.). · **A Study of the Value of the Living Vaccine in the Control of Bovine Infectious Abortion.**—*Cornell Vet.* 1926. July. Vol. 16. No. 3. pp. 166–185.

The work here recorded was carried out on a herd of 60 animals. Clinical records showed that between 1917 and 1921 the abortion rate ranged from 11·3 to 21 per cent. The first tests were carried out in 1918, when 72 per cent. of the animals gave positive or doubtful results.

At the beginning of the experiment the herd was divided into two groups which were equal in number and in percentages of reactors. The normal movement of animals into and out of the herd was not interfered with, as it was intended to carry out the experiment under natural conditions, but the numbers were kept as even as possible.

This led to the addition of animals both to the vaccinated and control groups as required. No isolation was practised save shortly before and after parturition, as is usually done in a well-managed herd.

As four breeds were represented in the herd four bulls were used. These constantly gave negative results to serological tests, and they were used to serve the infected and uninfected without any precautions against the possibility of their acting as mechanical transmitters.

The vaccines used were all prepared from recently-isolated organisms of known pathogenicity, and the vaccines were injected within three hours of preparation. The doses used were 20, 45, and 60 cc. The larger doses were injected at more than one place to reduce the risk of abscess-formation. Heifers were vaccinated two months before service, and cows immediately the uterus returned to normal after calving.

The data obtained in the course of the investigation are presented in the form of tabular statements, it being found impracticable by the author to present the results in a readily understood manner in any other way. The first two charts deal with clinical observations and the administration of vaccines. The second two with the results of pregnancy (abortion or otherwise) and bacteriological findings. The last table contains the results of serological tests. Of the vaccinated animals 81 per cent. calved normally and 19 per cent. aborted. The foetal membranes were retained in 30·9 per cent. of pregnancies. Of the animals calving normally 17·64 per cent. retained the membranes, while 87·5 per cent. of the animals which aborted failed to cleanse properly.

In the control group 71·2 per cent. calved normally and 28·7 per cent. aborted. Of the animals which calved normally 17 per cent. retained the membranes. The same thing occurred in 73·7 per cent. of those which aborted.

Five animals aborted twice, and of these 4 belonged to the unvaccinated herd.

The two groups appeared to conceive with equal readiness, the average number of services per pregnancy being 2·5. There was a little difference in the average number of pregnancies in the two groups during the period under view, namely, 1·88 for the vaccinated and 2·39 for the controls, but the authors explain this difference on the ground that " a number of the animals of the vaccinated group we disposed of when ' open ' following the termination of one pregnancy." " In considering the cases of sterility in the vaccinated group, and their probable relationship to the use of living vaccine,

it is of interest to note that the organism was not recovered in a single instance, either following normal calving or in the discharges incident to a metritis." Bacteriological examination showed that 30 per cent. of the vaccinated animals passed the organism out either with discharge or milk or both, and of the control group 42·4 per cent. excreted the organism by these paths.

Of 8 abortions occurring in the vaccinated group 5 (or 62·5 per cent.) were due to Bang's bacillus. One of the remaining three showed no evidence of infection with this organism, one aborted so early that the results obtained are open to doubt, and the remaining one was probably infected with the organism as this animal had always given a strong positive reaction in tests. Of 19 abortions in the control lot, 11 were due to *B. abortus* and 5 were not.

While in the negative cases *B. abortus* was not found, nor also were mucor or vibrio.

Summing up the bacteriological findings the authors state that while 30 per cent. of the vaccinated group passed the organism out of their bodies, in the unvaccinated group the percentage was 42·4.

Attention is drawn to the fact that the bacillus may be and has been isolated from animals failing to react to serological tests.

Cow 366 was vaccinated in July, 1923. She conceived to a fourth service, and calved January, 1925. In October, 1923, the agglutination titre was partial at 1 in 200, and complement fixation complete at 0·1 and 0·025. In September, 1924, the agglutination titre had dropped to partial in 1 in 25, while the complement fixation figures remained constant. In January, 1925, two days before calving the agglutination titre was quite negative while complement fixation remained positive. *B. abortus* was isolated from the placenta.

Cow 143 gave partial agglutination in 1 : 25 and 1 : 50 in October, 1922, and subsequently failed to react to either test, was found to be eliminating the bacillus with the milk in October, 1924, and it was isolated from the placenta in January, 1925. This animal aborted at the following pregnancy, but no evidence of infection with *B. abortus* was found.

Another example is given of a cow which had constantly yielded negative results to agglutination and fixation tests, and which was proved to be passing the bacillus with the milk. Among their conclusions the authors state that they have obtained no evidence that the use of the living vaccine retards conception or is responsible for sterility.

BIRCH (R. R.) & GILMAN (H. L.). **The Agglutination Test as an Aid in handling Bang Abortion Disease.**—*Cornell. Vet.* 1926. Apr. Vol. 16. No. 2. pp. 127–132.

The authors summarize information obtained as a result of having at their disposal an experimental herd of approximately 50 animals, for a period of about four years. Among other findings is their opinion that an agglutination titre of 1 in 40 is normal for non-infected heifers or cows. They consider a reaction at 1 in 40 and 1 in 80 is doubtful.

" The status of a cow, naturally infected, whose agglutination curve descends to normal and is thus maintained is not well determined. Certainly there is a degree of immunity or resistance developed, but whether the majority of such animals are *Bacterium abortum* carriers is yet to be determined. Our work indicates that they are not, but our data on this point are meagre."

CARPENTER (C. M.). *Brucella abortus* **in Udders of Vaccinated and Naturally Infected Cows.**—*Cornell Vet.* 1926. Apr. Vol. 16. No. 2. pp. 133–136.

Agglutinins were found in the blood of 86 per cent. of a group of animals which had been infected subcutaneously at least three times before three gestation periods with 10 cc. of living suspension of the organism. Twenty-four per cent. of this group aborted, and the bacillus was recovered from the milk of 38 per cent. of the animals. In a second group of cows which had aborted, or had had retention of the placenta at least once during three gestations and where no vaccination had been practiced, agglutinins were found. In 72 per cent. of the samples of blood there were agglutinins and the organism was present in 66 per cent. of samples of milk from these animals.

MOORE (Veranus A.) & CARPENTER (Charles M.). **Undulant Fever in Man associated with Bacteria Indistinguishable from** *Brucella abortus.*—*Cornell Vet.* 1926. Apr. Vol. 16. No. 2. pp. 147–152.

The authors briefly summarize the literature regarding the relationships of *B. melitensis* and *B. abortus* Bang.

In 1925 Carpenter isolated from the blood an organism indistinguishable from *B. melitensis.* This was successfully repeated on six occasions, and on three occasions the organism was isolated from the blood.

The second case occurred later in the same year. In this instance the patient showed reddish oedematous spots on the legs, an undulating fever and general malaise. Blood cultures gave positive results.

Four other positive cases have been encountered. One of these, occurring in a man aged 41, terminated fatally, and chronic splenomegaly was found. The second case had three attacks lasting about ten days, and at intervals of ten days. The third case was complicated with typhoid, and there is not available any history of the fourth.

Abortion bacilli have been proved to be present in the milk from the dairy supplying the first of these patients. The authors have produced abortion in heifers with the strains isolated from their first two cases. The organisms were recovered from the foetus, placenta and milk in each case. The strains were very virulent for guineapigs.

PANISSET (L.) & VERGE (J.). **Diagnostic de l'avortement épizootique des Juments,** [The Diagnosis of Equine Contagious Abortion.]—*C.R. Soc. Biol.* 1926. Mar. 19. Vol. 94. No. 10. pp. 640–641.

1. Microscopic examination of any of the tissues is practically useless.

2. Cultivation is an excellent method. The best media are agar and Marten's broth with a pH of 7·2–7·4.

3. Sera from infected mares cause agglutination in dilutions from 1-300 to 1-1,000 or higher.

Heating the serum for half an hour at 56° C. does not destroy its power of agglutinating.

Natural agglutinins may give a reaction up to 1 in 300, but these are readily destroyed at 56° C.

PANISSET (L.) & VERGE (J.). **Recherches bacteriologiques sur l'avortement épizootique des Juments.** [Mare Abortion. Bacteriological Investigations.]—*Ann. Inst. Pasteur.* 1926. June. Vol. 40. No. 6. pp. 524–540.

Since the paper by DASSONVILLE and RIVIÈRE was published in 1913, nothing appears to have been reported in French literature regarding mare abortion. In three cases the authors isolated a streptococcus from the heart blood, stomach, and bone marrow. The organism, which was the same in all three instances, possessed the following characters :—

It occurred in chains comprising 5 to 40 individuals, each of which was somewhat oval in shape.

It was gram-positive, and grew well at body temperature. Cultures required frequent renewal, particularly when the strains were recently isolated.

In broth cultures of pH 7·2 to 7·4 a flocculent sediment formed, the broth remaining clear. In slightly acid broth (pH 6·8 to 7) there was slight general turbidity, with flocculi adhering to the walls of the tubes. Milk was coagulated in 48 hours. No growth occurred on potato. In stab gelatin cultures there was a minimal amount of growth along the needle track, but no liquefaction.

The organism did not appear to be pathogenic for the rabbit and white rat, but the guineapig could be fatally infected and death took place in 24 to 45 days. It was not found possible to recover the organism from the tissues of dead guineapigs. Filtered broth cultures were toxic for the rabbit and guineapig. Death occurred in 30 to 45 days, but there were no recognizable lesions. Mice were resistant to subcutaneous inoculation with 1 and 2 cc. of filtrate.

Comparative tests indicated that the organism was not identical with the streptococcus of strangles. Bacilli of the colon type were recovered from two of the foetuses, in one case from the stomach and in the other from the heart blood, which also contained the streptococcus referred to.

In two instances *B. abortus equi* was isolated.

This organism is a short cocco-bacillus, which is motile, gram-negative and a facultative anaerobe.

The organism grows well at temperatures of 18°–20° C., and agar cultures may remain alive for two months. Virulence is rapidly lost in artificial cultures.

Transplantations should be carried out every month, but in sealed tubes. Kept in a refrigerator the organism will remain alive for three months or more. On agar a moist whitish growth is formed, but in some cases a dry semi-transparent layer is formed.

In broth there is a marked turbidity, but no surface growth. After several days the growth settles leaving the broth clear.

A moist whitish growth develops on potato, and the latter becomes brownish in three to five days. At the end of a month the colour is dark brown. Stab cultures in gelatin grow well, and there is no liquefaction.

The *B. abortus equi* reduces neutral-red agar and renders it fluorescent with production of gas. It ferments glucose, mannite, galactose, dulcite, laevulose, saccharose, maltose and glycerin, with gas production. The authors consider that the organism is related to the paratyphoid B group.

Rats are killed by intraperitoneal inoculation in 48 hours or less, while by the subcutaneous path death is delayed until the 5th or 6th day. Guineapigs behave in a similar manner.

The organism produces fatal infection in rabbits by intravenous inoculation only. Inoculation by other paths causes loss of appetite and condition and recovery is slow. The intravenous inoculation of the dog with 5 cc. of culture causes only a rise of temperature during the first 24 hours. Birds are resistant.

Filtrate causes a fatal result in guineapigs, death occurring in about a month. Rabbits are not susceptible to the toxin. On two occasions pregnant guineapigs have aborted as the result of inoculation.

Success has not been achieved in similar experiments with rabbits. Intraperitoneal or subcutaneous inoculation of rabbits enables them to resist a subsequent intravenous injection which is fatal to controls.

MAGNUSSON (H.). **Ueber Abortusinfektion beim Stier.** [Abortion Infection in a Bull Calf.]—*Berlin. Tierärzt. Woch.* 1926. July 9. Vol. 42. No. 28. pp. 460–462.

This article is a German translation of a paper by Magnusson which appeared in the *Skandinavisk Veterinaerdidskrift* in 1925.

A description is given of a diseased testicle and brief notes of the results of animal experiments are recorded. The paper contains a review of the cases of infection of bulls with *B. abortus*.

EHRLICH. **Ein Fall von Bangscher Abortusinfektion beim Bullen.** [A Case of Infection of a Bull with Bang's Bacillus.]—*Deut. Tierärzt. Woch.* 1926. June 26. Vol. 34. No. 26. pp. 469–473. With 3 text figs.

According to the owner the bull was 1 year and 10 months old, and had covered 30 cows on 6 farms. In almost every case conception occurred after a single covering. Four of the cows served aborted at 5 to 7 months. These cows were all the property of the owner of the bull, and the owner believed that these were the only cows on his premises that had aborted. Their serum yielded positive results to the agglutination test.

The bull, while grazing, had developed well, but when stalled he was a poor feeder and lost condition. He was never keen on covering cows, but even when there was recognizable enlargement of one testicle he was capable of covering without difficulty. The acute inflammatory condition extended to the spermatic cord and the animal lost condition, and the owner feared that death would supervene. The animal was, however, castrated, and although the wound suppurated considerably recovery took place and eventually the animal was sold for slaughter.

The affected testicle measured 13 centimetres long, 9 centimetres wide, and 6 thick. From the cut-end of the cord a thick whitish slimy liquid could be made to exude on pressure. The cut surface was of a saffron yellow colour, and there was an obvious increase in the amount of connective tissue. The epididymis contained a number of abscesses varying in size from a hazel nut downwards, and the testicular substance contained a very large number of centres about the size of a pin's head.

On microscopic examination of the diseased testicle the increased amount of connective tissue was very obvious, together with a

marked infiltration of plasma cells and round cells. Only a few of the spermatic canals still retained the normal-looking epithelial lining, but in these there was no evidence of spermatogenesis, the majority possessed a lining composed of a single layer of epithelium only. In the majority of cases the lumen was packed with cells of various kinds.

Smears stained with bacterial dyes revealed the presence of an organism indistinguishable from *Bacillus abortus*, and cultural and agglutination tests confirmed this.

BOEZ (L.). **Milieu de culture pour le bacille tuberculeux à base de peptone pancréatico-intestinale.** [A Culture Medium for the Tubercle Bacillus having a Pancreatico-Intestinal Peptone as the Basis.]—*Ann. Inst. Pasteur.* 1926. Sept. Vol. 40. No. 9. pp. 746–754.

The best method of preparing a culture medium rich in amines was to mix 100 grammes each of fresh meat, pancreas, and small intestine (from the pig) with 450 grammes of water, correcting the reaction to pH 7·5, and adding 20 cc. of chloroform. No definite advantage was gained by passing the meat through a peptic digestion also.

It is not necessary to allow the digestion to proceed beyond 48 hours.

The products of digestion were added to a medium composed of water 1 litre, glycerin 20 g., glucose 10 g., 0·25 g. magnesium sulphate, 1 gramme dibasic potassium phosphate, and 7 grammes of sodium chloride, in amounts ranging from 2 cc. to 20 cc. per 100 cc.

The media were compared by weighing the bacilli obtained, the conditions being duly controlled, and it was found that the addition of 10 per cent. gave the best results. The results were practically parallel with those obtained with the synthetic asparagin medium, but the cost is very much lower.

Filtration of the digest through Chamberland L3 slightly reduces its value. Sterilization for an hour twice at an interval of 24 hours and a single sterilization at 105° C. for an hour yielded practically parallel results, but sterilization for 10 minutes at 100° C. is said to be inferior, and this would, in view of what is said above, be an error. [Possibly the temperature referred to here should be 110° C.—Ed.]

Further experiments regarding the mineral content of the broth and other factors led to the following technique being adopted.

500 grammes each of fresh meat, pancreas and small intestine are cleaned of fat and finely minced. To two and a half litres of water are added 6 grammes of sodium carbonate and 40 grammes of chloroform. The whole are mixed together in a 5-litre flask and this is closed with a rubber stopper to prevent evaporation of the chloroform. The reaction should be pH 7·5. The mixture is left to deposit at 37° or better 40° C. for 48 hours. There should be no putrefaction. The process of digestion is stopped by the addition of sufficient hydrochloric acid to render the reaction distinctly acid. In this condition the digest can be stored in an ice chest or used as required.

The amount required is taken, filtered and sterilized and added in the proportion of 5 or 10 per cent. to the following mixture :—

Magnesium sulphate	0·25 g.
Dibasic phosphate of potassium ...	1 gramme.
Salt	7 grammes.
Distilled water	1,000 cc.

The media should have a reaction of pH 6·9.

After sterilization at 105° C. for an hour, the glycerine (20 cc.) and 10 grammes of glucose are added.

The medium can be used liquid, or solidified by the addition of 2·5 per cent. agar.

Tested against ordinary tuberculin and asparagin-medium tuberculin on tuberculous guineapigs, the digest-medium tuberculin was found to be eight times as effective as the former and twice as effective as the latter.

ABT (G.) & ERBER (B.). **Sur le titrage des antitoxines et des toxines tétaniques par la floculation.** [The Titration of Tetanus Antitoxins and Toxins by Flocculation.]—*Ann. Inst. Pasteur.* 1926. Aug. Vol. 40. No. 8. pp. 659–665.

The authors have tested RAMON'S method of flocculation titration of diphtheria toxins and antitoxins with tetanus toxins and antitoxins. Their technique has not yielded perfect results, but they claim 90 per cent. of successes.

SEDDON (H. R.) & CARNE (H. R.). **Determination of the Presence of *B. botulinus*, type B, in New South Wales.**—*New South Wales, Dept. of Agric. Vet. Res. Rep.* No. 2. (*Science Bull.* No. 26.) 1926. Apr. pp. 12–16.

In 1924 a number of horses and cattle were involved in what appeared to be an outbreak of forage poisoning (botulism); actual proof that the cases were those of botulism was wanting, but the authors record the recovery of *B. botulinus* from a sample of the fodder. The cultures were toxic for the guineapig by ingestion, and by serological tests the organism was identified as belonging to type B.

MARTINAGLIA (G.). **Fowl Typhoid.**—*Jl. Dept. Agric. Union S. Africa.* 1926. June. Vol. 12. No. 4. pp. 298–304.

The experience of a number of investigators, including the author, would appear to indicate that the majority of epidemics of septicaemic disease among fowls in South Africa are not fowl cholera, as has generally been held, but fowl typhoid. There is no information available regarding the introduction of the disease, but it would appear to be on the increase. The cause of the condition is the bacillus described by KLEIN in 1888 as *Bacillus gallinarum*. Subsequently the disease was studied by MOORE in the United States, and this author named the causal organism *B. sanguinarium*. HEDLEY later showed that the organisms isolated by MOORE and KLEIN were identical. The author of the present paper has had the opportunity of investigating five outbreaks in the Transvaal, Natal and East Griqualand.

The outbreaks were very severe, and save in one case, where the fowls were in separate coops, the mortality was high. The same organism was isolated from all the outbreaks, and under experimental conditions the period of incubation proved to be from two to six days.

The symptoms are sudden onset with considerable mortality. Birds show dullness, loss of appetite and great thirst. The feathers are ruffled, especially round the neck, and the head is held close to the body.

The wings droop, and the birds stand with eyes closed in a moping attitude. There is greenish diarrhoea. As a rule there is cyanosis of the comb.

The lesions are as follows : An excess of amber or blood stained fluid in the abdomen. Marked engorgement of the liver, spleen and kidneys. The liver may show multiple irregular necrotic areas. The heart muscle sometimes shows large haemorrhages, and this is held by some to be diagnostic of the disease. The author observed these lesions in three of the outbreaks investigated.

Methods for combating the disease are those generally applicable in such cases. Careful destruction of the dead birds, killing of the sick, penning of the healthy in as small batches as possible. General attention to hygiene.

The Onderstepoort Laboratory is supplying a vaccine.

UCHIDA (Y.). **Experimentelle Infektionen von Mäusen und Meerschweinchen parenteral und von den natürlichen Eingangspforten aus. I. Mitteilung. Versuche an Mäusen mit Milzbrand und anderen Septicämieerregern.** [The Experimental Infection of Mice and Guineapigs with Anthrax by Parenteral and Natural Paths.]—*Zeitsch. f. Hyg. u. Infektionskrankh.* 1926. Mar. Vol. 106. No. 1. pp. 96–112.

MYCOTIC DISEASES.

BARDELLI (Plinio Carlo). **Ricerche sulla linfangite criptococcica.** [Epizootic Lymphangitis.]—*Ann. d'Igiene.* 1926. Feb. Vol. 36. No. 2. pp. 105–117.

The author gives an account of a number of cases treated by vaccine, and claims a percentage of 84 cured.

OTA (Masao) & GALLIARD (Henri). **Sur une teigne trichophytique d'un bovidé du Cameroun produite par une espèce nouvelle de** *Grubyella, G. cameroun-ensis* **n. sp.** [A Bovine Ringworm in the Cameroon caused by a New Species of Grubyella, *G. camerounensis* n. sp.]—*Ann. Parasit. Hum. et Comp.* 1926. Jan. Vol. 4. No. 1. pp. 14–21. With 3 text figs.

DISEASES DUE TO FILTERABLE VIRUSES.

KLING (C.) & HÖJER (A.). **Recherches sur le mode de propagation de la fièvre aphteuse. Géographie et topographie des épizooties en Suède.** [The Spread of Foot-and-Mouth Disease. Geography and Topography of Outbreaks in Sweden.]—*C.R. Soc. Biol.* 1926. Mar. 12. Vol. 94. No. 9. pp. 613–615. With 1 text fig.

Foot-and-mouth disease has occurred in Sweden twelve times since 1875, the last outbreak occurring in November 1924. By May 1925, when the disease began to die down, 4,000 herds had been attacked.

In 10 instances the disease first made its appearance in that part of Sweden which is nearest to Denmark, and on every occasion the

disease was prevalent in Denmark at the time. In 9 instances the first outbreaks appeared in the south-west part of the province, where there is a large population and means of communication are well developed. The disease has never appeared in the wooded north-eastern part of the province.

Examination of the distribution of outbreaks shows that 90 per cent. have occurred in the lower-lying ground where the towns are situated.

Outbreaks appear far more frequently in large herds than in small ones. Only 1 per cent. of small farms have been involved, while 50 per cent. of farms of 50 to 100 hectares have been affected. The large "model" farms of more than 100 hectares have been affected somewhat less frequently (40 per cent.), but this is explained by the greater care taken of the animals (isolation, etc.). The higher incidence in large herds is, according to the authors, to be explained on the ground that the possibilities of contact between men and animals and between animals themselves are greater.

KLING (C.) & HÖJER (A.). **Recherches sur le mode de propagation de la fièvre aphteuse. Transmission du contage.** [The Method of Spread of Foot-and-Mouth Disease.]—*C.R. Soc. Biol.* 1926. Mar. 12. Vol. 94. No. 9. pp. 615–618. With 2 text figs.

The authors have not been able to obtain any evidence that the direction and force of the wind plays any part in the spread of the disease.

Of 66 farms involved during the early stages of the current outbreak only 25 per cent. used any fodder of foreign origin, and even in those cases there was no justification for supposing that the imported materials contained the virus.

When the disease makes its appearance on a number of premises simultaneously the source of origin is frequently a dairy.

With the exception of three, the last of which occurred in 1898, none of the outbreaks which occurred during the period 1875 to 1925 could be attributed to imported animals. The restriction of movement of animals during the course of an outbreak practically excludes animals as the means of spread.

The situation of 33 of the premises first involved in the 1924 outbreak is of interest. They were all grouped round four populous centres, Helsingborg, Kelvinge, Malmoe and Ystad, and it was established that 29 of these had had communication with one or other of these during the few days prior to the outbreaks. These towns all have a large tourist traffic.

When the first outbreaks were detected cases occurred upon two islands, upon both of which people had arrived from Helsingborg.

The authors come to the conclusion that man is the principal vector of the virus in the process of spread.

KLING (C.) & HÖJER (A.). **Recherches sur le mode de propagation de la fièvre aphteuse. Mécanisme de la transmission du contage par l'homme.** [The Manner in which the Virus of Foot-and-Mouth Disease is carried by Human Agency.]—*C.R. Soc. Biol.* 1926. Mar. 12. Vol. 94. No. 9. pp. 618–620.

In the present communication the authors summarize their observations regarding the manner in which the infection is carried by man.

They consider that the infection may be carried by a human being for periods ranging from 1 to 60 days.

Only 10 per cent. of vectors of virus are held to have visited infected premises, while 90 per cent. acquire it through infected milk or by contact with carriers of the virus (*individus porteurs du virus*).

The experiments of LEBAILLY, VALLÉE and CARRÉ have shown that under ordinary conditions the virus is very labile. It is therefore improbable that virus on clothing, boots, etc., remains infective for long. One is therefore forced to suppose that it is in the interior of man, probably in the mucous surfaces, that the virus is capable of maintaining itself. If this be so, then man would appear to be a true carrier of the virus. Cases of foot-and-mouth disease have been recorded during most outbreaks of the disease both in Sweden and abroad, but definitely diagnosed cases are of rare occurrence. In 1921 PAPE accidentally inoculated himself with virus from a pig, and established the pathogenicity of the virus for man. It might be thought that it would be a simple matter to arrive at a diagnosis in man by inoculating guineapigs with contents of vesicles in man, but the authors state that their observations lead them to think that by the 2nd or 3rd day the contents of such vesicles are no longer infective for the guineapig.

The infectivity of the virus for man can also be shown by the fact that in some instances at least (four out of seven) the serum from recovered human beings is destructive to the virus. Blood was taken from three children on an infected farm, who presented symptoms of the disease, two months after the illness developed. Two of the sera possessed specific destructive properties, but the third did not. Blood from 15 controls from uninfected areas were tested simultaneously, and in every case with negative result. Blood from 11 persons suspected of being carriers or transmitters of the virus was examined, but no evidence of specific antibodies was obtained.

Although proof has not been furnished of their existence, it cannot be denied that apparently healthy carriers may occur among men, as, indeed, is known to be the case with a number of diseases of the human subject.

In populous centres there may be a not inconsiderable number of carriers, but the danger attaching to them is lessened by the fact that only a small proportion of them come into contact with animals directly. But it must be remembered that the virus may be transferred from man to man, and this would tend to increase the spread of the disease. It is suggested that in passages from man to man the virus loses virulence, but that, on the other hand, the existence of some intercurrent disease such as influenza may stimulate the virus to multiply.

BUSCHLE (J.). **Über die Empfänglichkeit zahmer Ratten für Maul- und Klauenseuche.** [The Susceptibility of Tame Rats to Foot-and-Mouth Disease.]—*Deut. Tierärzt. Woch.* 1926. July 10. Vol. 34. No. 28. pp. 510–512.

The author states that while rats can be infected with the virus of foot-and-mouth disease, the infection cannot be carried on in series.

RUHLE (F.). **Über die Ginsschen Einschulszkörperchen bei Maul- und Klauenseuche.** [Gins' Inclusion Bodies in Foot-and-Mouth Disease.]—*Arch. f. Wissen. u. Prakt. Tierheilk.* 1926. June 24. Vol. 54. No. 3. pp. 197–212.

The author gives tabular statements showing that he has been able to find the "inclusion bodies" described by GINS as being present in the nuclei of epithelial cells and subepithelial connective tissue cells in the same situations in animals not affected with foot-and-mouth disease as well as in those so affected. Guineapigs, sheep and cattle were used.

He therefore concludes that they cannot be considered as specific. The paper is illustrated by four figures.

TRAUTWEIN (Karl). **Versuche zur Tenazität des Maul- und Klauenseuche Virus in der Auszenwelt.** [The Vitality of the Virus of Foot-and-Mouth Disease in the Outer World.]—*Arch. f. Wissenschaft. u. Prakt. Tierheilk.* 1926. July 24. Vol. 54. No. 4. pp. 273–279.

Lymph from lesions in pigs was allowed to become dry on various materials, such as sand, manure, cloth, and glass, and it was found to remain infective for periods ranging from 5 to 11 days. Epithelial shreds retain their virulence for much longer periods even when exposed to sunlight. Putrefaction and drying are also less effective in this case.

Fragments of epithelium placed in dung, in water or simply exposed to the air in the open remained virulent for periods ranging from 41 to 67 days.

Heating to 60° C. is rapidly fatal to the virus. A period of exposure to this temperature of five minutes is sufficient.

Epithelial shreds buried in dung to a depth of 30 centimetres become avirulent within 6 days.

TRAUTWEIN (Karl). **Maul- und Klauenseuchedesinfektion mit schwefliger Säure, speziell mit Sulfoliquid D.S.** [The Disinfection of Foot-and-Mouth Disease Virus with Sulphurous Acid, and particularly Sulfoliquid D.S.]—*Arch. f. Wissenschaft. u. Prakt. Tierheilk.* 1926. July. Vol. 54. No. 4. pp. 280–296.

The author finds that the sulphurous acid is particularly effective for the destruction of the foot-and-mouth disease virus, and that "Sulfoliquid D.S." is the best preparation. This has, however, a relatively small bactericidal action.

The material is used in 5 per cent. solution, and in this dilution it remains active for 5 days at least. Slight warming increases its activity.

Some other proprietary disinfectants were tested but they were inferior to Sulfoliquid.

WALDMANN (O.). **Ein Schluszwort zu den vorstehenden Versuchen Dr. Trautwein's über Virustenazität und Desinfektion bei Maul- und Klauenseuche.** [An Addendum to Trautwein's Experiments regarding the Vitality of the Virus of Foot-and-Mouth Disease.]—*Arch. f. Wissenschaft u. Prakt. Tierheilk.* 1926. July. Vol. 54. No. 4. pp. 297–298.

Waldmann draws attention to the difference in the behaviour of the virus and bacteria to disinfectants. The hypochlorites are active

against bacteria and not against the virus. Sulphurous acid acts in the reverse way. He considers that this indicates a distinct biological difference of some kind, and that it is a mistake to continue to attempt to cultivate the virus on media used for bacteria or modifications of these.

Unfortunately, there are at present no indications as to the direction in which work should proceed for the successful cultivation of the virus.

WALDMANN (O.) & TRAUTWEIN (K.). **Experimentelle Untersuchungen über die Pluralität des Maul- und Klauenseuche Virus.** [Experimental Investigation regarding the Plurality of the Foot-and-Mouth Disease Virus. Preliminary Communication.]—*Berlin. Tierärzt. Woch.* 1926. Aug. 27. Vol. 42. No. 35. pp. 569–571.

This paper contains a brief account of cross immunity tests carried out with strains of foot-and-mouth disease virus obtained from different sources. The publication of a full account of the work is promised. Working with 32 such strains, the authors were able to distinguish three main types of virus with a number of variants of these. It is remarked that the types had not geographical distributions. The experiments were carried out with both guineapigs and cattle, and more or less parallel results were obtained. The three strains or types of virus did not afford protection against each other, and thus animals could be re-infected three times within a brief period. The view put forward by VALLÉE and CARRÉ is thus supported.

LEVADITI (C.), NICOLAU (S.) & GALLOWAY (I. A.). **Passage du virus de la fièvre aphteuse à travers les membranes en collodion.** [The Passage of the Virus of Foot-and-Mouth Disease through Collodion Membranes.]—*C.R. Acad. Sci.* 1926. Jan. 18. Vol. 182. No. 3. pp. 247–248.

The virus used was one which had been maintained in guineapigs by plantar inoculation. It was filtered (apparently without dilution) through sacs made of three layers of Poulenc collodion under a pressure of 10 centimetres of mercury. The speed of filtration varied with the sac from 1 drop in 2 minutes to 1 drop in 5 minutes. The contents of the sacs and the filtrate, which were both bacteriologically sterile, were used for the inoculation of guineapigs.

Nine experiments have been carried out, and eight positive results have been obtained. Details of one experiment are given in which the filtrate produced vesicles in 18 to 24 hours and generalization in 36 hours to 4 days.

The authors conclude that the virus of foot-and-mouth disease will pass under pressure through collodion membranes which are practically opaque to proteids, permeable to bacteriophage, peptones, and amide-acids and which retain to a large extent alexin, haemolytic sensitiser, certain diastases (trypsin) and bacterial toxins.

The virus therefore behaves in a similar way to the viruses of rabies, encephalitis, herpes, and neurovaccine.

HUBAC (A.). **Le traitement et la prophylaxie de la peste bovine.** [Treatment and Prophylaxis of Rinderpest.]—1926. Paris: Vigot Frères. 56 pp.

The author of this short treatise is a Veterinary Inspector in Indo-china. The paper does not appear to contain anything new.

HORNBY (H. E.). **Studies in Rinderpest Immunity. (2) Methods of Infection.**—*Vet. Jl.* 1926. July. Vol. 82. No. 7. pp. 348–355.

In this paper the author deals with the sources of infection and the usual avenues of infection. Experiments in connexion with the former revealed nothing contrary to what is stated in reliable text-books, but experiments in connexion with the second point yielded results at variance with the belief that infection usually takes place through the alimentary tract.

The nasal discharge is infective on or even before the second day of the febrile reaction, but is no longer so on the second or third day after the remission of fever.

Urine appears to be non-infective until the third day of fever, and is non-infective about 4 days after the temperature has subsided.

Rinderpest virus appears to have little specific action on the kidneys, but frequently causes acute cystitis, and the author believes that most of the virus present in the urine is attached to cells derived from the blood vessels of the congested mucous membrane of the bladder.

The faeces are infective on the 6th day of the reaction, and in mild cases cease to be so three or four days after it has subsided, but where there is acute diarrhoea the faeces may be infective for a longer period.

The author does not consider rinderpest very infectious, as in mild cases several days of contact may not in some instances suffice for the transmission of the disease.

Although probably all the secretions and excretions contain the virus, they are not invariably infective.

Experiments have shown that while the virus cannot infect an animal through sound skin, it readily gains access to the body through broken skin.

The author has proved by experiment that *Glossina morsitans* can transmit the infection.

It is readily transmitted by subcutaneous, intravenous and intra-peritoneal inoculation, but Hornby has experienced difficulty in transmitting the disease by ingestion. Virus introduced into the rumen by means of a canula passed through the abdominal wall caused infection in one case out of three. Three animals in which the virus was introduced directly into the abomasum died, but as leakage from the abomasum is more likely to take place than leakage from the rumen actual proof is not furnished by this experiment.

Intrarectal injections of 200 cc. of virulent blood failed to set up infection.

Infection is readily set up by the respiratory tract by drenching via the nostrils, and intratracheal injection. Swabbing the nasal mucous membrane with infective material is also a certain method of infection. This may readily happen in nature when an animal pushes its nose into urine that is being passed by an infected beast.

The swabbing of the conjunctiva with an infective liver extract transmitted infection, but swabbing with lachrymal discharge from an animal dying of rinderpest failed to transmit the disease.

STICCO (Emilio). **Richerche urologiche nella rabbia sperimentale del coniglio.** [Urological Researches in Experimental Rabies in the Rabbit.]—*La Clin. Vet.* 1926. June. Vol. 49. No. 6. pp. 345–359.

The author has found albumen in the urine in 121 out of 123 rabbits dying of fixed virus. In one case a negative result was obtained, and in the remaining case sufficient urine was not present.

In 51 cases sugar was found, in 2 the reaction was doubtful, and in 69 it was definitely negative.

In a single case of street rabies no albumen was found in the urine, but sugar was present.

PHISALIX & MARCENAC (M.). **La soi-disant immunité naturelle du chien Sloughi aux venins de scorpion et de vipère ainsi qu'au virus rabique.** [The Alleged Natural Immunity of the Sloughi Dog to the Venom of the Scorpion and of the Viper and to the Virus of Rabies.]—*Bull. Soc. Path. Exot.* 1926. June 9. Vol. 19. No. 6. pp. 438–440.

The belief that the Sloughi, a greyhound-like dog, is immune to the venoms of the scorpion and viper and to the virus of rabies is widely held among the natives of Morocco.

Experimentally, it was found that a single sting of a scorpion was sufficient to kill a young sloughi of about the size of a fox terrier, but that it required more than one to affect an adult dog. The susceptibility of the dog to the venom was proved by using a maceration of the glands of the scorpion.

Similarly, a dose of 0·87 mg. per kilog. of venom of *Vipera aspis* proved as fatal to adult sloughis as to ordinary dogs in France.

Using the fixed virus from the Pasteur Institute at Paris, the authors found the sloughi normally susceptible to the rabies virus.

BELIN (M.). **Conservation et exaltation de la virulence du virus aphteux par cultures simultanées avec le virus vaccinal.** [Preservation and Exaltation of Virulence of the Foot-and-Mouth Disease Virus by Simultaneous Cultivation with the Vaccine Virus.]—*C. R. Soc. Biol.* 1926. Apr. 9. Vol. 94. No. 12. pp. 816–818.

MISCELLANEOUS.

JAUFFRET (R.) & HAW (Ngutjôn-Cêng). **Un cas d'ostéomalacie. Son traitement par le salicylate de soude en injection intraveneuse.** [Osteomalacia treated by Intravenous Injection of Salicylate of Soda.]—*Rev. Vet.* 1926. Aug. Vol. 78. No. 8. pp. 481–484.

The subject was a four-year-old native horse which showed the usual symptoms of osteomalacia including the enlargement of the bones of the jaws. Faecal examination showed that ascarides were present

but no cylicostomes. There was no equipment available for analysis of the urine. For the worms 1 gramme of arsenious acid was prescribed daily for 8 days. On the fourth day of treatment an intravenous injection of 100 cc. of a solution composed of 400 cc. of water containing 12 grammes of sodium salicylate was given. Two days later the gait appeared to have improved. A second injection of 100 cc. was given and at the same time four injections each of 1 cc. of turpentine were give in the neighbourhood of the enlarged near shoulder-joint. The general condition of the animal improved and fixation abscesses developed at the shoulder. These were evacuated and soon healed up. Subsequently progress towards recovery was steady and the animal had almost completely recovered.

SEDDON (H. R.) & CARNE (H. R.). *Diplarrhena moraea* **Labill.** *New South Wales. Dept. Agric. Vet. Res. Rep.* No. 2. 1926. Apr. pp. 44–45.

Freshly-cut leaves of the plant (N.O. Iridaceae) were offered to a heifer, but were refused. When cut and mixed with chaff about 7 lbs. were eaten on one day, and about 2 lbs. on the following day. Diarrhoea with blood in the faeces followed. There was loss of condition, but recovery took place in a few days after the plant was stopped.

i. SEDDON (H. R.) & CARNE (H. R.). **Feeding Experiments on Cattle with** *Hibbertia volubilis* **(F. u. M).**—*New South Wales. Dept. Agric. Vet. Res. Rep.* No. 2. 1926. Apr. pp. 41–42.

ii. ——. ——. **Feeding Experiments with** *Bartsia trisago.*—*Ibid.* p. 43.

i. The plant came under suspicion as being poisonous, and in feeding experiments it was found that cattle could only be induced to eat it when the fresh shoots were mixed with other food. There was some salivation but no other symptoms of illness were seen.

ii. Stock do not readily eat this plant and the ingestion of small amounts is not followed by the development of symptoms.

SEDDON (H. R.) & CARNE (H R.). **Staggers in Stock due to Rough-Bearded Grass** (*Echinopogon ovatus*). **Preliminary Account.**—*New South Wales. Dept. Agric. Vet. Res. Rep.*—No. 2. 1926. Apr. pp. 34–40.

The condition described in this paper is said to be quite distinct from the Staggers due to Mallow (*Malva parviflora*), stagger weed (*Stachys arvensis*) or *Lamium amplexicaule.*

It was found by investigation that when the suspected plant was removed from the diet improvement and then recovery took place.

Two adult sheep which received 1½ lb. daily for three weeks developed no symptoms, nor did a lamb which consumed 1 lb. per day for a month. Another lamb which was fed for 40 days developed very definite symptoms.

A yearling calf which consumed 192 lbs. in 25 days remained normal.

Further investigations are to be undertaken, but it appears that prolonged feeding is required to produce symptoms even in young animals. The grass appears to lose some of its harmful properties when it is cut, and it appears to be less harmful when it has seeded.

SEDDON (H. R.), HINDMARSH (W. L.) & CARNE (H. R.). **Further Observations on *Stachys arvensis* ("Stagger Weed") as a Cause of Staggers or Shivers in Sheep.**—*New South Wales. Dept. Agric. Vet. Res. Rep.* No. 2. 1926. Apr. pp. 25–33.

The experiments recorded in this paper indicate that two factors are concerned in the production of staggers in sheep, viz., the age of the animal and the amount of seed present in the feed. Young animals develop symptoms of intoxication before older ones. The seed appears to be the important part of the plant from the point of view of staggers production.

VAN SACEGHEM (R.) & WITVROUWEN. **Empoisonnements dus à des vegetaux, observés au Katanga chez des bovidés.** [Cases of Poisoning in Cattle caused by Plants in Katanga.]—*Bull. Méd. Katanga.* 1926. Feb. Vol. 3. No. 1. pp. 17–18.

The authors have been able to detect strychnine, veratrine, aconitine, and digitalin in the liver of animals dying from plant poisoning.

Analyses of plants have revealed the presence in these of strychnine, veratrine, and digitalin. The plants themselves have been sent to Belgium for identification.

METALNIKOV (S.). **Contribution à l'étude de l'immunité chez les invertébrés.** [Immunity in Invertebrates.]—*Ann. Inst. Pasteur.* 1926. Sept. Vol. 40. No. 9. pp. 787–826. With 9 text figs.

The view has long been held that immunity is a process of adaptation in one form or another, and the essence of the process of immunization is that the changes are progressive.

The author claims that there is another type of immunity, which he terms immunity of defence. Adaptation immunity is based upon loss of sensibility, while defence immunity is an exaltation of the sensibility of the cell, and of the power of reaction. External reactions take place when the injurious substance, of whatever nature, comes into contact with mucous membranes. The reactions of mucous membranes all have for their object the removal of the substance. The substance is, in fact, one which stimulates mucous membranes into activity.

Internal reactions, which result from actual invasion of the tissues by some excitant, are far more complicated, because all the tissues represent a complex balanced system, and all therefore take part in reactions.

Among lowly organized animals immunity of adaptation is mainly seen, but in those more highly organized the immunity is an active one of defence.

In both vertebrates and invertebrates immunity to invasions by bacteria may be achieved in three ways: (1) By destruction, e.g., ingestion by phagocytes; (2) isolation, that is encapsulation; (3) elimination as in abscess formation. In these processes the various

defensive cells of the reticulo-endothelial system play the important part. In fact the introduction of an antigen of any kind stimulates the cellular tissues and they react with increased vigour.

SCHENNER (S.) & EIGENDORF (R.). **Die diagnostische Bedeutung des Kaninchen-impfversuche bei der infektiösen Anämie der Pferde.** [The Diagnostic Importance of Rabbit Inoculations in Infectious Equine Anaemia.]—*Arch. f. Wissenschaft. u. Prakt. Tierheilk.* 1926. July. Vol. 54. No. 4. pp. 299–336.

The authors claim to show that the phenomena observed by OPPERMAN in rabbits inoculated with the anaemia virus are not specific. Repeated subcutaneous or intraperitoneal injections of extracts of gastrus larvae, of normal horse or pig serum will produce exactly the same effects. By carefully graduating the dose it can be found that the first injection produces an increase in the number of red cells. After one or two days there is a fall to below the normal. This persists for a day or two, and then balance is again restored. During the reaction the temperature tends to rise. With subsequent injections the increase in blood corpuscles tends to become smaller and smaller, while the drop in the number persists or becomes greater. Anaemia thus produced may last for weeks. It is associated with an elevation of temperature or loss of weight. Other evidences of anaemia make their appearance, and death may occur. All rabbits do not react in the same way to the same dose. By a particular dose severe anaemia may be caused in one and slight anaemia in another.

A single injection of 15 to 20 cc. of blood from a rabbit showing this anaemia will reproduce the condition in a sound rabbit.

In some cases the picture of anaemia has been produced by a single subcutaneous injection of 8 cc. of normal pig serum, 20 cc. of normal horse serum and 20 cc. of normal rabbit blood or serum after inactivation. The pig serum is the most effective for producing this condition.

MIESSNER (H.). **Seuchenhafte Gehirn-Rückenmarksentzündung des Schafes. Meningo-Encephalomyelitis epidemica ovis.** [Epidemic Meningo-Encephalomyelitis of the Sheep.]—*Deut. Tierärtz. Woch.* 1926. Sept. 4. Vol. 34. No. 36. pp. 637–639.

The author briefly reviews the literature regarding the occurrence of this disease, and points out that its resemblance to Borna disease of horses was detected by PRIETSCH in 1896.

The symptoms and lesions of two cases are described, and it is recorded that one rabbit contracted infection by inoculation. The results of further inoculation tests are to be published later.

WITKAMP (J.). **Een geval van "braakziekte" bij den hond.** [A Case of "Vomiting-Disease" in the Dog.]—*Ned.-Ind. Blad. v. Diergeneesk.* 1925. Aug. Vol. 37. No. 4. pp. 392–393.

Witkamp mentions two cases of "vomiting-disease," and states that the condition was reported to be not uncommon in Batavia. He describes in detail a case in a fox-terrier, about one year old. The

dog had for 3 days shown dullness, and a constant tendency to vomit; when seen by him, it showed a high temperature, slow pulse, and pale and icteric membranes. The urine contained a little protein and bile pigments, and occasional piroplasms were found in the red corpuscles; treatment with trypanblue caused rapid improvement, and recovery within three days. He considers that piroplasmosis should be borne in mind in cases of persistent vomiting, especially if associated with icterus; he mentions that such vomiting may be an early, and for a time the only, symptom of rabies.*

Schmid (G.). **Knochenbrüche beim Kamel (Dromedar).** [Fractures of Bones in Camels.]—*Berlin. Tierärzt. Woch.* 1926. June. 25. Vol. 42. No. 26. pp. 425–427.

---

* Summarized by Dr. W. H. Andrews.

BRITISH MUSEUM 1 DEC 26

INDEX OF AUTHORS.

A

Abt, G., & B. Erber, 153
Adie, H., 57
Adler, S., & O, Theodor, 135
Alceo, G., 93
Andrews, W. H., with Bayliss, & Sheather, 137
Andrieu, A., 103
Anfiloff, —, with Newodoff & others, 22
Archibald, R. G., & D. Riding, 132
Arkwright, J. A., & M. Burbury, 29
Arroyo y Martin, C., 117
Aygar, V. R., 77

B

Baber, E., 17
Banham, G. A., & W. J. Young, 81
Barbacci, P., 87
Bardelli, P. C., 118, 119 *bis*, 154
Barotte, J., 130
Basset, J., 20, 67
Baylis, H. A., 14 *bis*, 15, 122, 138
  A. L. Sheather, & W. H. Andrews, 137
  with T. C. Pan, & J. G. B. Sambon, 15
Bedford, G. A. H., 16
Bedson, S. P., & H. B. Maitland, 29
Berg, H., 5
Berge, R., with Miessner, 86, 116
Bernard, M., with Fabre, 129
Bevan, Ll. E. W., 1, 25, 42
  & M. H. Kingcome, 10
Bigot, A., & H. Velu, 78, 79
Birch, R. R., & H. L. Gilman, 148
Blacklock, D. B., 138
Blanc, G., & J. Caminopetros, 142
Blenkinsop, L. J., & J. W. Rainey, 44
Boez, L., 152
Bohn, H., 119
Bosselut, R., 60
Bourdenko, N. N., & N. L. Givago, 107
Boyd, J. E. M., 74
Boyd, W. L., with Tubbehusen, & Fitch, 147
Braga, A., & A. Fonseca, 92
Bridré, J., & A. Donatien, 70
Brocq-Rousseu, Staub, & Urbain, 144
Bubberman, C. & F. L. Huber, 76
Buck, J. M., & G. T. Creech, 101
Burbury, M., with Arkwright, 29
Burns, W. A., with Hornby, 86
Buschle, J., 156
Buzna, D., 23

C

Cameron, T. W. M., 15, 40
Caminopetros, J., with Blanc, 142
Carne, H, R., with Seddon, 153, 161 *quat.*
  with Seddon, & Hindmarsh, 162
Carpenter, C. M., 149
  with Moore, 149
Carré, H., with Vallée, & Rinjard, 111
Cassamagnaghi, A., 13
Castelli, A., 94
Catanei, A., & L. Parrot, 136
Cawston, F. G., 140
Chandler, A. C., 13, 61
  & R. N. Chopra, 43
Césari, E., 7
Chopra, R. N., with Chandler, 43
Collier, W. A., 85
Compton, A., 99
Connaway, J. W., A. J. Durant, & H. G. Newman, 100
Contis, G., 128
Cowdry, E. V., 37, 38, 41, 42
Cram, E. B., with Hall, 16
  with Schwartz, 16
Crawford, M., with Nicholls, 62
Creech, G. T., with Buck, 101
Crew, F. A. E., 121
Curasson, G., 1, 20, 32, 64
Curson, H. H., 2, 51, 79

D

Dahmen, H., 52
Dawydoff, A. M., with Yakimoff, 136
Delamare, G., 10
Delpy, L., 143
Dervaux, P., with Henry, & Leblois, 63
Descazeaux, J., 92
Deschiens, R., 12, 55
Descombey, P., 104 *bis*
Dieben, C. P. A., 141
Dios, R. L., 5
  & J. A. Zuccarini, 1, 60
  J. A. Zuccarini, & F. Oyarzabal, 2
Dobell, C., 57
Dogiel, V., 60
di Domizi, G., 32, 76
Donatien, A., with Bridré, 70
  with Edm. Sergent, Parrot, Lestoquard, & Plantureux, 128
Donatien, M., 6
Doskocil, A., with Nicolau, & Galloway, 4
Drbohlav, J. J., 11
Drouin, V. F., 98
Duke, H. L., 50
Durant, A. J., with Connaway, & Newman, 100
Dye, W. H., 133

E

Eberbeck, E., 118
Edelmann, —, 120
Edwards, J. T., 23, 120 *quat*
Eigendorf, R., with Schenner, 163
Erber, B., with Abt, 153
Ehrlich, —, 151

F

Fabre, H., & M. Bernard, 129
Fitch, C. P., with Tubbehusen, & Boyd, 147
Fonseca, A., with Braga, 92

dog had for 3 days shown dullness, and a constant tendency to vomit ; when seen by him, it showed a high temperature, slow pulse, and pale and icteric membranes. The urine contained a little protein and bile pigments, and occasional piroplasms were found in the red corpuscles ; treatment with trypanblue caused rapid improvement, and recovery within three days. He considers that piroplasmosis should be borne in mind in cases of persistent vomiting, especially if associated with icterus ; he mentions that such vomiting may be an early, and for a time the only, symptom of rabies.*

Schmid (G.). **Knochenbrüche beim Kamel (Dromedar).** [Fractures of Bones in Camels.]—*Berlin. Tierärzt. Woch.* 1926. June. 25. Vol. 42. No. 26. pp. 425–427.

---

* Summarized by Dr. W. H. Andrews.

BRITISH 1 DEC 26 MUSEUM

INDEX OF AUTHORS.

A

Abt, G., & B. Erber, 153
Adie, H., 57
Adler, S., & O, Theodor, 135
Alceo, G., 93
Andrews, W. H., with Bayliss, & Sheather, 137
Andrieu, A., 103
Anfiloff, —, with Newodoff & others, 22
Archibald, R. G., & D. Riding, 132
Arkwright, J. A., & M. Burbury, 29
Arroyo y Martin, C., 117
Aygar, V. R., 77

B

Baber, E., 17
Banham, G. A., & W. J. Young, 81
Barbacci, P., 87
Bardelli, P. C., 118, 119 *bis*, 154
Barotte, J., 130
Basset, J., 20, 67
Baylis, H. A., 14 *bis*, 15, 122, 138
  A. L. Sheather, & W. H. Andrews, 137
  with T. C. Pan, & J. G. B. Sambon, 15
Bedford, G. A. H., 16
Bedson, S. P., & H. B. Maitland, 29
Berg, H., 5
Berge, R., with Miessner, 86, 116
Bernard, M., with Fabre, 129
Bevan, Ll. E. W., 1, 25, 42
  & M. H. Kingcome, 10
Bigot, A., & H. Velu, 78, 79
Birch, R. R., & H. L. Gilman, 148
Blacklock, D. B., 138
Blanc, G., & J. Caminopetros, 142
Blenkinsop, L. J., & J. W. Rainey, 44
Boez, L., 152
Bohn, H., 119
Bosselut, R., 60
Bourdenko, N. N., & N. L. Givago, 107
Boyd, J. E. M., 74
Boyd, W. L., with Tubbehusen, & Fitch, 147
Braga, A., & A. Fonseca, 92
Bridré, J., & A. Donatien, 70
Brocq-Rousseu, Staub, & Urbain, 144
Bubberman, C. & F. L. Huber, 76
Buck, J. M., & G. T. Creech, 101
Burbury, M., with Arkwright, 29
Burns, W. A., with Hornby, 86
Buschle, J., 156
Buzna, D., 23

C

Cameron, T. W. M., 15, 40
Caminopetros, J., with Blanc, 142
Carne, H. R., with Seddon, 153, 161 *quat.*
  with Seddon, & Hindmarsh, 162
Carpenter, C. M., 149
  with Moore, 149
Carré, H., with Vallée, & Rinjard, 111
Cassamagnaghi, A., 13
Castelli, A., 94
Catanei, A., & L. Parrot, 136
Cawston, F. G., 140
Chandler, A. C., 13, 61
  & R. N. Chopra, 43
Césari, E., 7
Chopra, R. N., with Chandler, 43
Collier, W. A., 85
Compton, A., 99
Connaway, J. W., A. J. Durant, & H. G. Newman, 100
Contis, G., 128
Cowdry, E. V., 37, 38, 41, 42
Cram, E. B., with Hall, 16
  with Schwartz, 16
Crawford, M., with Nicholls, 62
Creech, G. T., with Buck, 101
Crew, F. A. E., 121
Curasson, G., 1, 20, 32, 64
Curson, H. H., 2, 51, 79

D

Dahmen, H., 52
Dawydoff, A. M., with Yakimoff, 136
Delamare, G., 10
Delpy, L., 143
Dervaux, P., with Henry, & Leblois, 63
Descazeaux, J., 92
Deschiens, R., 12, 55
Descombey, P., 104 *bis*
Dieben, C. P. A., 141
Dios, R. L., 5
  & J. A. Zuccarini, 1, 60
  J. A. Zuccarini, & F. Oyarzabal, 2
Dobell, C., 57
Dogiel, V., 60
di Domizi, G., 32, 76
Donatien, A., with Bridré, 70
  with Edm. Sergent, Parrot, Lestoquard, & Plantureux, 128
Donatien, M., 6
Doskocil, A., with Nicolau, & Galloway, 4
Drbohlav, J. J., 11
Drouin, V. F., 98
Duke, H. L., 50
Durant, A. J., with Connaway, & Newman, 100
Dye, W. H., 133

E

Eberbeck, E., 118
Edelmann, —, 120
Edwards, J. T., 23, 120 *quat*
Eigendorf, R., with Schenner, 163
Erber, B., with Abt, 153
Ehrlich, —, 151

F

Fabre, H., & M. Bernard, 129
Fitch, C. P., with Tubbehusen, & Boyd, 147
Fonseca, A., with Braga, 92

Fortner, J., with Gins, 75
Froloff, —, with Newodoff & others, 22
Fujimura, S., T. Toyoshima, & T. Suenaga, 99
Funaioli, G., 60
Furikoff, M. J., with Yakimoff, Galouzo, & Lukianoff, 91
Futamura, H., 107

G

Gallego, A., 119
Galliard, H., with Ota, 77
Galli-Valerio, B., 6
Galloway, I. A., 13
  with Levaditi, & Nicolau, 158
  with Nicolau, 32
  with Nicolau, & Doskocil, 4
Galouzo, J. G., with Yakimoff, Loukianoff, & Furikoff, 91
  with Yakimoff, Loukianoff, Rastegaïeff, Roumianzeff & Woitzekhowsky, 91
  with Yakimoff, Markoff-Petraschewsky, Loukianoff, Woitzekhowsky & Yakowleff, 91
Gaupillat, M., & Neveux, 7
Gilman, H. L., with Birch, 148
Gins, H. A., & J. Fortner, 75
Girard, G., & F. Legendre, 64
Givago, N. L., with Bourdenko, 107
Glass, A., with Müller, 123
González, R., 105
Goodey, T., 138
Grasset, E., 107
Graub, E., 146
Guérin, F. H., & R. Pons, 11
Guillet, R., with Mathis, 137

H

Hadwen, S., 15
Hall, G. N., with Hornby, 35
Hall, M. C., & E. B. Cram, 16
Haralambopoulo, —, & Papachristophilou, 37
Haw, N-C., with Jauffret, 160
Helm, R., 76
Henry, A., & C. Leblois, 57
  C. Leblois, & P. Dervaux, 63
Hindmarsh, W. L., with Seddon, & Carne, 162
Höjer, A., with Kling, 154, 155 *bis*
Hornby, H. E., 49, 50, 159
  & W. A. Burns, 86
  & G. N. Hall, 35
Howard, G. G., 84
Hruska, C., 71, 144
Hubac, A. 159
Huber, F. L., with Bubberman, 76
Huddleson, I. F., with Runnells, 72
Hung, S-L., 140

I

Ihle, J. E. W., with Smit, 14
Imanishi, K., with Sobernheim, 105
Inouye, Z., 73
Issaitchikoff, J. M. & M. Weinberg, 93
Izquierdo, A., 83 *bis*

J

Jack, R. W., 94
Jacotot, H., 74, 105
Jakimow, W. L. (*see also* Yakimoff), 10
  & W. Wassilewskaja, 9, 56
  W. Wassilewskaja, E. Markowa, & E. Rastegaewa, 10
Jalabert, H., with Velu, 121
Jalabert, M., 121
Jauffret, R., & N-C. Haw, 160
Jeantet, P., 42
de Jeney, A., 27
Jones, W. N., with Walton, 63, 64

K

Keane, P. M., 98
Keevil, A., 133
Kellersberger, E. R., 132
Kingcome, M. H., with Bevan, 10
Kinghorn, A., 3
Klarin, E., 106
Kligler, I. J., 58
  & I. Weitzman, 130
Kling, C., & A. Höjer, 154, 155 *bis*
Knowles, R. H., 6, 122
Kohanawa, C., & K. Ogura, 7
Kolpakoff, T. A., 89
Kolpakowa, T., 9
Krijgsman, B. J., with Nieschulz, 12
Krikorian, K. S., with Stuart, 28

L

Lagas, D., 132
Laigret, J., 87
Lander, G. D., 124
Lebailly, C., 28
Leblois, C., with Henry, 57
  with Henry, & Dervaux, 63
Leckie, V. C., 53
Leclainche, —, & Vallée, 104
Le Coultre, A. P., 120
Legendre, F., with Girard, 64
Lestoquard, F., with Edm. Sergent, Donatien, Parrot, & Plantureux, 128
Levaditi, C., S. Nicolau, & I. A. Galloway, 158
Little, R. B., with Smith, 101
Lopez, C. L., 69
Loukianoff, W. A., with Yakimoff, Galouzo, & Furikoff, 91
  with Yakimoff, Markoff-Petraschewsky, Woitzekhowsky & Yakowleff, 91
Loukianoff, W. L., with Yakimoff, Markoff-Petraschewsky, Galouzo, Rastegaïeff, Roumianzeff & Woitzekhowsky, 91
Lührs, E., 28

M

McAlpine, J. G., & L. F. Rettger, 25
Macdonald, N., with Marshall, 39
McKay, A. C., 93, 139
Magneville, A., 56
Magnusson, H., 151
Maitland, H. B., with Bedson, 29
Malfroy, M. F., 116
Marcenac, M., with Phisalix, 160
Markoff, E. N., with Yakimoff, Wassilewsky, & Rastegaïeff, 89

Markoff-Petraschewsky, E. N., with Yakimoff, 136
with Yakimoff, Galouzo, Loukianoff, Pastegaieff, Roumianzeff, & Woitzekhowsky, 91
with Yakimoff, Galouzo, Loukianoff, Woitzekhowsky, & Yakowleff, 91
Markowa, E., with Jakimow, Wassilewskaja, & Rastegaewa, 10
Marshall, A., & N. Macdonald, 39
Martin, M. A., 58
Martinaglia, G., 153
Mathis, C., & R. Guillet, 137
Mazza, S., 134, 137
& F. Rosenbusch, 139
Mélanidi, C., & M. Stylianopoulo, 27
Méry, M. F., 74
Metalnikoff, S., 162
Meyn, A., with Miessner, 146
Miessner, H., 163
& R. Berge, 86, 116
& A. Meyn, 146
Miller, G. A., with Yakimoff, 12
Millzner, T. M., 141
Minett, F. C., with Stockman, 108
Mitchell, C. A., 24
Monod, T., & H. Velu, 102
Moore, V. A., & C. M. Carpenter, 149
Morin, H., & J. Valtis, 67
Morin, H. G. S., 67
Morita, H., 69, 103
Müller, G., & A. Glass, 123
Muller, L., 21
Muto, K., 79

N

Nagao, M., 36
Nelson, J. B., 100
Neveux, —, with Gaupillat, 7
Newman, H. G., with Connaway, & Durant, 100
Newodoff, A. P., Weintrob, Pinous, Wladimirski, Anfiloff, & Froloff, 22
Nicholls, L., & M. Crawford, 62
Nicolas, E., 102
Nicolau, S. A., Doskocil, & I. A. Galloway, 4
& I. A. Galloway, 32
with Levaditi, & Galloway, 158
Nieschulz, O., 129
& B. J. Krijgsman, 12
Nieschulz, O. C. H., 136
Norris, J. H., 140

O

O'Brien, H. R., 138
Ogura, K., with Kohanawa, 7
Ohlsson, L., 99
Ono, S., 36
Ota, M., & H. Galliard, 77
Oyarzabal, F., with Dios, & Zuccarini, 2

P

Pan, T. C., with Baylis, & Sambon 15
Panisset, L., & J. Verge, 12, 149, 150
Papachristophilou, —, with Haralambopoulo, 37
Parrot, L., with Catanei, 136
with Edm. Sergent, Donatien, Lestoquard, & Plantureux, 128
Patay, R., 12
Pérard, C., 56, 90
Phadke, V. R., & A. L. Shaikh, 9
Phisalix, —, & M. Marcenac, 160
Pillers, A. N., 139
Pinous, —, with Newodoff & others, 22
Plantureux, E., 114, 115
with Edm. Sergent, Donatien, Parrot, & Lestoquard, 128
Pons, R., with Guérin, 11
Puntoni, V., 80
Pupo. J. A., 135-

Q

Quiroga, S. S., 84

R

Rabagliati, D. S., 33, 120
Rabatel, M. J., 141
Rainey, J. W., with Blenkinsop, 44
Ramon, G., 72
Rastegaewa, E., with Jakimow, Wassilewskaja, & Markowa, 10
Rastegaïeff, E. F., with Yakimoff, Markoff-Petraschewsky, Galouzo, Loukianoff, Roumianzeff, & Woitzekhowsky, 91
with Yakimoff, Wassilewsky, & Markoff, 89
Remlinger, P., 116
Rettger, L. F., with McAlpine, 25
Riding, D., with Archibald, 132
Rinjard, P., with Vallée, 65
with Vallée, & Carré, 111
Robertson, A., with Thomson, 11
Rodhain, J., 95
Rosenbusch, F., with Mazza, 139
Ross, I. C., 62
Rottcardt, A., with Ruppert, & Scasso, 11
Rottgardt, A., 145
Roumianzeff, E. W., with Yakimoff, Markoff-Petraschewsky, Loukianoff, Rastegaïeff, & Woitzekhowsky, 91
Row, R., 8
Ruhle, F., 157
Runnells, R. A., & I. F. Huddleson, 72
Ruppert, I., A. Rottcardt, & R. Scasso, 11

S

van Saceghem, R., 4, 50, 51, 85, 87, 110, 127, 132
& Witvrouwen, 162
Sachelarie, V., 22
Saheki, Y., 16
Sambon, J. E. B., with Baylis, & Pan, 15
Sandground, J. H., 62
Scasso, R., with Ruppert, & Rottcardt, 11
Schenner, S., & R. Eigendorf, 163
Schern, K., 74, 116
Schmid, F., 111
Schulz, R. E., with Skriabine, 64
Schwartz, B., 16, 93
& E. B. Cram, 16

Scott, J. P., 145
Sebastiano, R., 94
Seddon, H. R., 23, 136
& H. R. Carne, 153, 161 *quat*
V. L. Hindmarsh, & H. R. Carne, 162
Seelemann, M., 26
Séguy, E., 65
Sergent, Edm., A. Donatien, L. Parrot, F. Lestoquard, & E. Plantureux, 128
Shaikh, A. L., with Phadke, 9
Sheatner, A. L., 90
with Bayliss, & Andrews, 137
Singer, E., 21
Skriabine, K. I., & R. E. Schulz, 64
Smit, B., 17, 95
Smit, H. J., 61
& J. E. W. Ihle, 14
Smith, T., 100
& R. B. Little, 101
Sobernheim, G., & K. Imanishi, 105
Soituz, S., 103
Soule, M. H., 2
Staub, A., 69
Staub, —, with Brocq-Rousseu, & Urbain, 144
Sticco, E., 160
Stockman, S., & F. C. Minett, 108
Stuart, G., 24
& K. S. Krikorian, 28
Stylapanopoulo, M., 60
Stylianopoulo, M., with Mélanidi, 27
Suenago, T., with Fujimura, & Toyoshima, 99
Symons, T. H., 139

T

Tanabe, M., 55, 135
Tatin, —, & Velu, 102
Taylor, W., with Walker, 111
Teppaz, L., 105, 117
Theiler, A., 40
Theodor, O., with Adler, 135
Thomson, J. G., & A. Robertson, 11
Toyoshima, T., with Fujimura, & Suenago, 99
Trautwein, K., 29, 157 *bis*
with Waldmann, 158
Triffitt, M. J., 83, 88
Tubbehusen, R. E., C.P. Fitch, & W. L. Boyd, 147

U

Urbain, —, with Brocq-Rousseu, & Staub, 144

V

Vallée, —, with Leclainche, 104
Vallée, H., H. Carré, & P. Rinjard, 111
& P. Rinjard, 65
Valtis, J., with Morin, 67
van den Branden, F., 87 *bis*
Vaysse, —, with Velu, 21
Velu, —, & Vaysse, 21
with Tatin, 102
Velu, H., & H. Jalabert, 121
with Bigot, 78, 79
with Monod, 102
Verge, J., with Panisset, 12, 149, 150

W

Waldemann, —, 29
Waldmann, —, 114,
Waldmann, O., 157
& K. Trautwein, 158
Walker, G. K., & W. Taylor, 111
Walravens, P., 49
Walton, C. L., & W. N. Jones, 63, 64
Ware, F., 14 *bis*
Wassilewskaja, W., with Jakimow, Markowa, & Rastegaewa, 10
Wassilewskaja, W. J., with Jakimow, 9
Wassilewsky, W. J. (*see also* Wassilewskaja, W.), with Yakimoff, 56
with Yakimoff, Markoff, and Rastegaïeff, 89
Weinberg, M., with Issaitchikoff, 93
Weintrob, —, with Newodoff & others, 22
Weitzman, I., with Kligler, 130
Winkel, A. J., 111
Witenberg, G., 13
Witkamp, J., 127, 163
Witte, J., 101
Witvrouwen, —, with van Saceghem, 162
Wladimirski, —, with Newodoff & others, 22
Woitzekhowsky, A. M., with Yakimoff, Markoff-Petraschewsky, Galouzo, Loukianoff, & Yakowleff, 91
with Yakimoff, Markoff-Petraschewsky, Galouzo, Loukianoff, Rastegaïeff, & Roumianzeff, 91

Y

Yakimoff, W. L. (*see also* Jakimow), 89 *bis*, 90 *bis*, 91
& A. M. Dawydoff, 136
J. G. Galouzo, W. A. Loukianoff, & M. J. Furikoff, 91
& E. N. Markoff-Petraschewsky, 136
E. N. Markoff-Petraschewsky, J. G. Galouzo, W. I. Loukianoff, E. F. Rastegaïeff, E. W., Roumianzeff, & A. M. Woitzekhowsky, 91
E. N. Markoff-Petraschewsky, J. P. Galouzo, W. A. Loukianoff, A. M. Woitzekhowsky, & S. P. Yakowleff, 91
& G. A. Miller, 12
& W. J. Wassilewsky, 56
W. J. Wassilewsky, E. N. Markoff, and E. F. Rastegaïeff, 89
Yakowleff, S. P., with Yakimoff, Markoff-Petraschewsky, Galouzo, Loukianoff, & Woitzekhowsky, 91
Yorke, W., 3
Young, W. J., with Banham, 81

Z

Zuccarini, J. A., with Dios, 1, 60.
with Dios, & Oyarzabal, 2

INDEX OF SUBJECTS.*

Compiled by MISS M. H. JAMES.

Note.—Incidence, Treatment, &c., are indexed only under Diseases, and not under Animals affected by the Diseases.

Abortion, Contagious
- Bovine
  - Abortoscope for Detecting, **25**
  - Agglutination Test as Aid in Handling, **148**
  - *B. abortus* Infection in Udders, **72, 149**
    - Nature of, **72**
  - in Palestine, **24**
  - Infection in Bull, and in Bull Calf, **151** *bis*
  - Prophylaxis
    - Inoculation or Vaccination by Living Vaccine, **147**
      - Effects of, **101**
  - Serological Studies on, **25**
  - Treatment by Abortion-Bacterin of Cow with Infected Udders, **101**
- Diagnosis of, Comparative Experiments in the Complement Fixation Test and with Agglutination in, **101**
- Equine
  - Bacteriological Investigations, **150**
  - Diagnosis, **149**
- Parasites Associated with *Brucella abortus*
  - Bacteria Indistinguishable from, associated with Undulant Fever in Man, **149**
  - Biological and Serological Study of, **99**
  - Bovine Strains: CO_2 Requirements among, Variations in, **100**
  - Isolation of, from Uterine Exudate and Diseased Placenta; Rapid Method, **100**
  - Testicle-changes due to, **99**
  - in Udders, *see supra, under* Bovine
- *B. abortus equi*, Biology and Serology of, **99**
- Porcine, Investigations into, **100**

Abortion, Vibrionic [in Sheep], **106**

Agalaxia, Contagious, in Sheep and Goats [Algeria], Organism of, **70**

Anaemia
- Contagious, Pernicious or Infectious Red Blood Corpuscle Reduction in, Pathogenesis of, **36**
- Equine
  - Diagnostic Importance in, of Rabbit Inoculations, **163**
  - Transmission Experiments with Guinea pigs, **76**

Anaplasmosis
- Bovine
  - Haematological and Urological Studies connected with, **92**
- Incidence: Brazil, 92

Antelope, Deer, &c.
- Parasites
  - Amoebae, **83**
  - *Ostertagia asymmetrica*, **14**

Anthrax, 21
- *B. anthracis* of
  - Receptivity for, of Peritoneum and Blood, **20**
  - Virulent and Vaccine Strains of, Differentiation of, by Carbohydrate Fermentation, **23**
- Bovine, **22**
- Equine, 22
  - Vaccination
    - Intradermal against, **103** *bis*
      - in the French Army of the Levant, 1925, **102**
      - Single Dose, **102**
- Immunization Experiments, **144**
- Incidence
  - Czecho-Slovakia, 72
  - French Guinea, **143**
  - Levant, **102**
  - Morocco, 102 *bis*
- Infection, Experiments with, **142**
  - Mechanism of, **21**
- Porcine: Morocco, 21
- Prophylaxis
  - Anti-Anthrax Serum for, New Mode of Preparing: Can this Serum be Titrated? **144**
  - Vaccination
    - Cuti-Vaccination and Cuti-Immunity in, **22**
      - Comparison of, with Subcutaneous, **22**
      - Single-dose, 143
        - Duration of Immunity conferred by, **21**
    - Vaccines for, **71**
      - Accidents from the Use of, **103**
      - and Immunity, **102** *ter*, **103**

Asses
- Diseases of
  - Dourine, 130
  - Lachrymal Blastomycosis, 78

* The numbers in heavy type refer to the titles of papers summarized.

Bacteriology, 20–7, 65–73, 99–108, 142–54
Anatoxin of *B. chauvoei*, **69**
Antitoxins: Production Methods, **72**
Bacilli, Cocci, &c., referred to
abortus, see under **Abortion, Contagious**
anthracis, see under **Anthrax**
botulinus, type B., in N.S.Wales, Presence of, Determination of, **153**
chauvoei, see also Clostridium chauvoei, infra
Culture Medium for Differentiating from Pasteur's Vibrion Septique, **142**
Protective Qualities of, Sterilized by Formol, **69**
Toxin of, Immunization by, of Bovines, **67**
Haemophilus ovis n. sp., Disease due to, in Sheep, **24**
parabotulinus, 23
tuberculosis, Culture Medium for, with Pancreatico-Intestinal Peptone as Basis, **152**
Clostridium chauvoei in U.S.A. and elsewhere, **145**
Flagella
Morphological Changes of, depending on their Age, 73
Staining Methods for, **73**
Staphylococcic Infections, Suppurative Lesions in, Treatment by Filtrates, by Besredka's Method, **107**
Culture Medium, Tarozzi, made with Milk, for Differentiation of *Clostridium chauvoei*, from the *Vibrion Septique* of Pasteur, **145**
Stains, Romanowsky, Azur in, **80**
Tetanus Antitoxins and Toxins, Titration of, by Flocculation, **153**
Titles of Unnoticed Papers, 27, 154
Toxins Mixed with Tapioca, Resistance to, of Guineapigs, and the Part Played by Tapioca in the Reaction, **107**

Bali Disease [Bovine], **120**

Birds, *see also* **Fowls,** *and under Names*
Diseases
Coccidiosis, **136**
Spirochaetosis, **136**

Blackquarter, or Blackleg, 104
Bovine, **145** *bis*, **146**
Causal Organism, Strains of, Study of, **145** and Ovine; Comparative Investigations, **146**
Parasites Associated with
B. chauvoei
Protective Qualities of, Sterilized by Formol, **69**
Toxin of, Immunization by, of Bovines, **67**
Oedema-bacillus of: Germ-free Filtrate and Culture-Dilutions of, Immunization Experiments with, **105**
Pathology of, **69**
Experimental Study of, **103**

Blackquarter, or Blackleg—*cont.*
Protective Inoculation against, with Graub-Zschokke Germ-Free Filtrate, **146**

Blastomycoses, Animal, 78, 79
Lachrymal, of Donkeys, 78

Borna Disease
Equine, 163
Treatment by Urotropin, **119**

Botulism in Animals, Australia: Causes, **23**

Camels and Dromedaries
Sexually Abnormal, A, **121**
Surra in, **53**

Carcinoma of the Conjunctiva of Hereford Cows [South Africa], **42**

Carnivora
Mesocestoides lineatus of, Relationship between, and *Dithyridium* of the Mouse, **64**

Cats
Carbon Tetrachloride Toxic to, **43**
Diseases of
Peritoneal Echinococcosis, **63**
Protozoal Enteritis, **58**
Parasites of
Dipylidium genus, **141**
Giardia cati in Domestic Animals, **55**
Gnathostomes, 14
Helminthic, **61**
Parametorchis noveboracensis (Fluke), **140**

Cattle and other Bovines
Attempt to Keep, in Tsetse fly Belt, by Aid of Drugs, **86**
Diseases
Anaplasmosis, **92**
Anthrax, **22**, 102
Bali, **120**
Blackquarter, or Blackleg, **67, 69, 105, 145** *bis*, **146**
Carcinoma of the Conjunctiva in Herefords, **42**
Coccidiosis, **10, 136**
Contagious Abortion, **24, 25** *bis*, **72, 100, 101** *bis*, **147, 148, 149,** 151 *bis*
Contagious Pleuropneumonia, **36**
Diarrhoea from Eating *Diplarrhena moraea*, **161**
Foot-and-Mouth, 28, 29, **108–14, 154–6**
Gas Oedema, **26**
Haemorrhagic Septicaemia, **105**
Hypodermosis, **98**
Johne's, **65**
Liver Fluke, **140**
Nasal Granuloma [or Snoring Disease], **77**
Osteophagia, **40**
Piroplasmoses
Babesiasis, **6** *bis*, **56, 90, 91**
Theileriasis, Congenital, **56**
Piroplasmosis-like, **7**
Present in Egypt, **120**
Prophylaxis of, **120** *bis*

Cattle and other Bovines—*cont.*
Diseases—*cont.*
Rabies, 114
Rinderpest, **32, 33, 35, 116, 120, 159-60**
Ringworm, **77**
Staggers, **161**
Trypanosomiases, **1, 5,** 85, **129**
Nagana, **50**
Surra, 129, **132**
Tuberculosis, **20, 105**
Feeding Experiments on, with Various Plants, N.S. Wales, **161** *quat*
Parasites
Babesiella major n. sp., **128**
Blepharocorys bovis n. sp., **60**
Gongylonema, 94
scutatum, **137**
Spirochaete, *theileri*-like, **13**
Plants Poisonous or Injurious, to in
Katanga, **162**
New South Wales, **161** *quat*
South Africa, **79**

Coccidiosis
Avian, **136**
Bovine
Blood change during, **136**
in Rhodesia, **10**
Caprine : Argentina, **11**
in Rodents,
Rabbits, **56, 89** *bis*, **136**
Natural Immunity of, thereto, Part played in, by the Gastric Juice, **89**
Rats, **90**
White, Blood-Change during, **136**
Parasites associated with
Coccidia
Oocysts of Detection Methods, **9**
Ovine, **90**
in Rabbit's Liver, Pseudo-tubercles due to, **10**
Eimeria stiedae
Oocysts of, Maturation Time, **10**
of Rabbits, **89**
Porcine : Russia, **10,** 89

Conjunctivitis
Cryptococcic, Experimental, in the Dog, **27**

Dermatitis, Contagious Pustulous, in Swine, **107**

Dogs
Diseases of, 123–4
Cryptococcic Conjunctivitis, Experimental, **27**
Leishmaniasis, **7, 8, 9, 60**
Dermal, **134**
Piroplasmosis, **127, 128**
Protozoal Enteritis, **58**
Rabies, **74** *ter*, 114, **116**
Spirochaetoses, **12**
Surra, Chronic, 127
Vomiting (Braakziekte), **163**
Parasites
Babesia canis, **127**
Ctenocephalus canis, **64**
Dipylidium genus, **141**

Dogs—*cont.*
Parasites—*cont.*
Dirofilaria immitis, **62**
Filarial Embryos, **139**
Spirocerca sanguinolenta (in Foxhound), **139**
Spirochaete, **60, 137**
Sloughi, Alleged Immunity of, to the Venom of Scorpion and Viper and to the Virus of Rabies, **160**

Domestic Animals *see also under Names*
Coccidiosis of : Russia, **89**
Helminths from : Mauritius, **14**
Hygienic Maintenance of, **120**

Ecthyma, Contagious
of Lips of Small Ruminants, **74**
Incidence
Annam, 74
France, 74

Echinococcosis, Peritoneal in Cat, **63**

Elephants
Strongylidae n. sp. Parasitic in, **13**

Encephalitis, Enzootic Equine, *see also* **Borna Disease**
Ovine Disease Resembling, **163**

Enteritis, Protozoal, of Dogs and Cats, **58**

Entomology
Chorioptes scabei, causing Scab in Goats, 141
Fleas of Rats, from Madagascan Plague Areas, **64**
Flies, *see also Muscidae infra, and under Names*
Light-Trap for, **98**
Fly Control by Fly-Larval-trap Manure Enclosure (*ill.*), **17**
Fly-traps ; Construction (*ill.*), **95**
Light-trap, **98**
Glossina
Areas Infested by, Cattle-keeping in, by Aid of Drugs, **86**
Distribution
Lower Ouelle, **95**
Rhodesia : Lomagundi District, **94**
Investigation Efforts, Co-ordination of, **3**
Protection from, of Cattle by Drugs, **86**
Haematopinus muris Infestation : Treatment by Salicylidene Compounds, **99**
Hypoderma bovis Infestation of Cattle : Prevention : Treatment, **98**
Muscidae, Exotic, whose Larvae are Parasitic, **65**
Phlebotomus papatasii, Transmission by, of Dermal Leishmaniasis to Man, 135
Sheep Blow-Fly Control
by Fly-trap, **95**
New Method, **17**
Sheep Nasal Fly, South Africa, **16**
Simulium damnosum, *Onchocerca volvulus* in, Further Development of, **138**

Entomology—*cont.*
Stomoxys calcitrans, Experiments with, on Surra Transmission, **129**
Tabanidae, Transmission Experiments with, and Surra, **129**
Ticks, Diseases Spread by, *see* Spirochaetosis, Avian
Rickettsia ruminantium n. sp., in Tissues of those Transmitting Heartwater, 38
Theileria parva Spread by, **127**
Species Named
Argas persicus, Preservation in, of the Organism causing Avian Spirochaetosis, **136**

Filterable Viruses, Diseases due to, 29–37, 74–6, 108–17, 154–60
Titles of Unnoticed Papers, 37, 117, 160

Foot-and-Mouth Disease
Centres of, Re-appearance of, and Preservation in Nature of the Virus, **28**
Experimental, in Rabbits, **75**
Incidence
Belgian East Africa, **110**
Sweden, Geography and Topography of, **154, 155**
Inclusion Bodies in, **29**
Gins', **157**
Investigations into, **111**
Pathogenicity of, for Rabbits, **32**
Prophylaxis
Control by Chemotherapy, **111**
Inoculation, **29, 69**
Simultaneous and Curative, **114**
Rats, Tame, Susceptibility of, to this Disease, **156**
Spread, **154**
Mode of, **155** *bis*
Researches on, **154**
in Swine, 157
Transmission of, to Rodents, **29**
Virus of
Cultivation of, Attempted, and its Reaction to Various Agents, **29**
Disinfection of, with Sulphurous Acid, especially Sulfoliquid D.S., **157**
Formolized, Immunization by Means of, **113**
Passage of, through Collodion Membranes, **158**
Plurality of, Experimental Investigation of, **158**
Preservation of, in Nature, **28**
Researches on, **108**
Vitality of, in Ether, **111**
in the Outer World, **157** *bis*

Fowl Plague, in Geese, Northern Italy, **116**

Fowl Typhoid : South Africa, **153**

Fowls
Diseases
Fowl-Cholera, **69**
Fowl-Typhoid, **153**
Spirillosis, **4**
Spirochaetosis, **60**

Gas Oedema
in Cattle and Sheep, Bacteriological Diagnosis of, **26**

Geese : Fowl Plague in, **116**

Goats
Diseases
Coccidiosis, **11**
Contagious Agalaxia, **70**
Contagious Ecthyma of Lips, **74**
Scab, **141**
Variola, 37

Granuloma
Nasal, in Cattle [Madras], **77**

Heartwater
Etiology, **37, 38**
Rickettsia ruminantium n. sp. in
Tissues of Infected Animals, **37**
Tissues of Ticks Transmitting the Disease, **38**

Helminthology
Carbon Tetrachloride as Anthelmintic, **16**
Diseases
Ankylostomiasis
Treatment by Chenopodium-Carbon Tetrachloride, **138**
Ascariasis
Equine, **15**
Liver Fluke, in Sheep and Cattle, Control of, **140**
Parasites
of Cats (*q.v.*) Calcutta, and the Relation of Cats to Human Helminthic Infections, **61**
Collection of, from Domesticated Animals : Mauritius, **14**
Ascaris, from Sheep, **138**
lumbricoides, Hosts of, 138
Bilharzia crassa in Sheep : Sardinia, **93**
Centrorhynchus erraticus n. sp., of Cats, Calcutta, 61
Cryptocotyle concavum, Development of, **93**
Dirofilaria immitis in Dog : N.S. Wales, **62**
Dipylidium genus from Cats and Dogs, **141**
Dithyridium of Mouse and *Mesocestoides lineatum* of Carnivora, Relationship between, **64**
Echinococcus genus [Validity of], **140**
Fasciola hepatica, Intermediate Hosts of, in N.S. Wales, **93, 139**
in Wild Rabbit : England, **139**
Filaria spirovoluta n. sp., from Horse, **14, 61**
Filarial Embryos in Dogs, N. Argentine, **139**
Flukes, Rhodesian ; Carriers of, Problem of, **140**
Gnathostome, Life-history of, **13**
Gongylonema in Alimentary Tract of Butchers' Animals : Ravenna, **94**
Experiments on, in N. Italy, **15**
Species Parasitic in Ruminants, **15**

Helminthology—*cont.*
PARASITES—*cont.*
Gongylonema—*cont.*
scutatum, Transmission experiments with *Blattella germanica* Fed with, **137**
subtile, Identity of, **14**
Hepaticola gastrica n. sp. from Rat's Stomach, **138**
Heterakis neoplastica, Identity of, **14**
Hymenolepis nana, Development of, **16**
Liver Fluke in Sheep, Control of, **63**
Micronematodum ovis n. sp. : Sardinia, **94**
Nematoda, genera and species of, Synopsis of, **122**
Nematodes from China, **93**
Onchocerca volvulus, in *Simulium damnosum*, Further Development of, **138**
Ostertagia asymmetria from Fallow-deer, **14**
Parametorchis noveboracensis n. sp., in Cats, **140**
Spirocerca, felineus n. sp., 61
sanguinolenta, in Foxhound, **139**
Strongylidae n. sp. of Elephants, **13**
Strongyloides genus, Speciation and Specificity in, **62**
Subulura chinensis n. sp., **94**
Veterinary, Recent Advances in, **15**

Hog-Cholera
Experimental of Guineapigs. The Skin in : Infection and Immunization, **27**

Horse-Sickness : Senegal, **117**

Horses
Diseases
Anthrax, 22, **102** *bis* **103**
Ascariasis, **15**
Borna, **119,** 163
Botulism, 23
Contagious Abortion, **149, 150**
Contagious Anaemia, **163**
Epizootic Lymphangitis, 78, 117, **154**
Horse-Sickness, **117**
Meningitis, Cerebral and Spinal, **119**
Osteomalacia, **160**
Piroplasmosis **7**
Strangles, **23**,
Tetanus, **104** *bis*
Trypanosomiases, 1
Dourine, **52**, 83, 130
Mal de Caderas, 60
Surra, **84,** 129
Verminous Ophthalmia, **62**
Parasites
in the Philippines, **16**
B. abortus equi, **99**
Filaria spirovoluta n. sp., **14**
Spirochaete, **60**

Jaziekte
Epithelial Proliferations in, Origin of, and Subsequent Changes, **42**
Etiology, **41, 42**
Incidence : South Africa, in Sheep, 41
Primary Lesions, **41**

Johne's Disease
Bacillus of, Filtration of, through Chamberland L2 Filters, **67**
in Cattle ; Immunization Experiments, **65**
Experimental in Rat : Visceral Lesions, **67**

Leishmaniasis
CANINE, **7, 60**
Dermal ; Argentina, **134**
DERMAL
Canine, **134**
Transmission of, to Man from *Phlebotomus papatasii* [Jericho], **135**
Incidence : All Forms, 7
Argentina, **134**
India : Bombay, **8**, 9
Italy ; Sienna, **87**
Tripoli, **60**
MUCOSAL, Treatment by Éparseno, **135**
Parasites associated with
Leishmania, Cultural and Serological Relationship of, **58**
infantum, **87**

Lions
Parasites of : *Giardia* sp., cysts of, **12**

Lymphangitis Epizootic, = Cryptococcic, **117, 154**
Antigenotherapy in, **118**
Cryptococcus farciminosus of, Cultivation of, **119**
EQUINE, 78
Etiology, **118**
Morbid Anatomy, **119**
Pathological Histology, **118**
Prophylaxis
Inoculation, **76**
Possibility of, Questions of, **119**
Treatment by Vaccinotherapy, 76, **154**

Mange, Sarcoptic, OVINE ; Dahomey, 141

Meningo-Encephalomyelitis Epidemic, in Sheep, **163**

Metazoan Parasites, Diseases due to, 13–20, 61–5, 93–9, 137–42
Equine and Porcine : Philippines, **16**
Titles of Unnoticed Papers, 19–20, 65, 99, 142

Miscellaneous, 37–43, 79–81, 119–21, 160–4
Carbon Disulphide, Toxic Action of, **79**
Exam. by Dark Ground Illumination of Fixed and Coloured Specimens, **42**
Immunity in Invertebrates, **162**
Titles of Unnoticed Papers, 43, 81, 121, 164
Tropical Technique, Hints on, **39**

Mules
Diseases
Anthrax, **102**
Epizootic Lymphangitis, 78

Mycology, 27, 76–9, 117–19, 154
Title of Unnoticed Paper, 154

Ophthalmia, Verminous, Equine : Ceylon, **62**

Osteomalacia
EQUINE, Treated by Salicylate of Soda, Intravenous, **160**

Osteophagia
BOVINE : South Africa, **40**

Owls
Parasites of
Subulura chinensis n. sp., 94
Trichomonads, **55**

Pigeons : *Haemoproteus columbae* of, 57–8

Piroplasmoses (Plasmoses) BABESIASIS, including Red Water, Texas Fever, &c., & THEILERIASIS, including East Coast, & Egyptian Fevers
BOVINE (Babesiasis), **6, 56, 91**
Campaign against : Province of Petrograd, 1924 & 1925, **90** *bis*
Treatment
Apiroplasmine, **91**
Ichtargan, **91**
Protargol, **91**
Silver Salvarsan, **91**
CANINE ; Latent, **127**
[Treatment with Trypanblue : Cure], **128**
Disease Resembling, of Cattle, **7**
Incidence, All Forms, All Animals
Algeria, **6,** 56
Dutch East Indies : Java, 127
France
Haute-Marne, **7**
Rhone Valley, **6**
Greece, **128**
Japan : Sapporo (Disease resembling), **7**
Ruanda-Urundi District, 127
Russia, **56**
North-West, **91**
Petrograd Province, **90** *bis*
Parasites associated with
Babesia canis, **127**
Babesiella major n. sp., of Bovines, France, **128**
Piroplasma (*Babesia*) *caballi*, **7**
Theileria parva, Spread of, by Ticks, **127**
THEILERIASIS
BOVINE, Congenital, **56**

Plants referred to
Bartsia trisago, Feeding Experiments with, N.S. Wales, **161**
Causing Staggers, **161, 162**
Diplarrhena moraea, N.S. Wales, Diarrhoea in Heifer, from Eating, **161**
Echinopogon ovatus (Rough-bearded Grass) Feeding Experiments with,, and Staggers due to, N.S. Wales, **161**
Ferula, Toxicity of, **121** *bis*
Hibbertia volubilis, Feeding Experiments with, N.S. Wales, **161**
Lamium amplexicaule Staggers due to, N.S. Wales, **161**
Mallow, Staggers due to, **161**
Poisonous or Injurious to Stock, in
Katanga, 162
New South Wales, **161** *quat*
South Africa, 79

Plants referred to—*cont.*
Stachys arvensis or Stagger Weed, N.S. Wales, **161, 162**

Pleuropneumonia, Contagious
in Cattle Imported [into Japan], **36**

Protozoology, 1–13, 49–61, 83–92, 127–37
PROTOZOAN PARASITES
of Sewer Rats : Petrograd, **12**
Amoebae in Faeces of African Ungulates, **83**
Entamoeba histolytica, Culture Media for, **11**
and Flagellates of Man : Cultivation Methods, 11 *ter*
Blepharocorys bovis n. sp., in Russian Cattle, **60**
Coccidia of the Family Diplosporidae, Classification of, **57**
of Rabbits, **56**
Flagellates, Application to, of Noguchi's Fixing Agent for Spirochaetes, **12**
Giardia = *Lamblia*
Cysts of, in *Felis leo*, **12**
cati of Domestic Cats, **55**
simoni in Rodents, Holland, **12**
Haemoproteus columbae, Sporogony of, **57**
Isospora, Species of, in Man, **57**
Spirochaetes, Noguchi's Fixing Agent for, Applied to Flagellates, **12**
Trichomonads from Man, Rat, and Owl, Cultivation of, **55, 135**
Titles of Unnoticed Papers, 13, 61, 92, 137

Rabies
Atypical Case, **74**
BOVINE : France, **114**
CANINE, **74** *ter*, 114, **116**
Diagnosis, Histological, Points in, **28**
Experimental in Rabbits, Urological Researches in, **160**
Incidence
France, 114
Morocco, 160
Prophylaxis
Anti-Rabic Procedure in Palestine, with Special Reference to Decentralization of Treatment, **28**
Immunization, Compulsory, of Dogs, Necessity for, **116**
Inoculation
Antirabic of Animals, **114**
Japanese Single Injection Method, **74**
Rapid, of "Passage" Rabbits with Virus of, **116**
Fixed, Algerian, Infectivity of, by Intra-Ocular Inoculation, **115**
and Venom of Scorpion and of Viper, Alleged Immunity to, of the Sloughi Dog, **160**

Reports, 43–4, 122
Dutch East Indies, Dept. Agric. Indus. & Commerce (1924), 43
India : Muktesar, Imp. Bact. Lab. (ending Mar. 31, 1924), 44

Reports—*cont.*
Sudan Government: Veterinary Research Officer's (Oct. 1924 to Sept. 1925), 122

Reviews, 44–7, 81–2, 122–5
Diseases of the Dog, and their Treatment (Muller & Glass), 123–4
Synopsis, A, of the Families and Genera of Nematoda (Baylis), 122
Table of Veterinary Posology (Banham & Young), 81
Veterinary Services: History of the Great War (Blenkinsop & Rainey), 44–7
Toxicology (Lander), 124–5

Rinderpest or **Cattle Plague**
Immunity Studies, **35, 159**
Incidence
French West Africa, **116**
India, **120**
Indo-China, 159
Infection, Methods of, **159**
Prophylaxis, **159**
Anti-Rinderpest Serum, Virus for Hyper-immunizing in Production of, 76
Hyperimmune Oxalated Blood, in, **32**
Serum for, Potency of, **33**
Sequelae, and Virus-Carriers, **32**
Susceptibility and Resistance, **35**
Treatment, **159**
Virus of, Nature of, **120**

Ringworm
in Ox, due to *Grubyella camerounensis* n. sp., **77**

Rodents
Mice
Diseases of: Phthiriasis, **99**
Parasite of, *Dithyridium*, Relation of, to one in the Carnivora, **64**
Rabbits
Diseases and Affections of
Coccidiosis, **56, 89** *bis*, **136**
Natural Immunity to, **9, 89**
Ferula-poisoning, 121
Pseudo-Tubercles in Livers of, due to Coccidia, **10**
Rabies, Experimental, **160**
Spirochaetosis, **137**
Pathogenicity for, of Foot-and-Mouth Disease, **32**
Wild, *Fasciola hepatica*, in, **139**
Rats
Diseases
Coccidiosis, **90**
Foot-and-Mouth, Experimental, **156**
Parasites
Fleas, **64**
Hepaticola gastrica n. sp., **138**
Trichomonads, **55**
Parasites: *Giardia simoni*, **12**
Transmission to, of Foot-and-Mouth Disease, **29**

Ruminants, *Gongylonema* Parasitic to, **15**

Scab: in Goats, D.E.I., **141**

Scorpion Venom, Alleged Immunity to, of the Sloughi Dog, **160**

Septicaemia, Haemorrhagic
Bovine. Leon, **105**

Sheep
Diseases
Anthrax, 102
Blackquarter, **146**
Contagious Agalaxia, **70**
Contagious Ecthyma of Lips, 74
Gas Oedema, **26**
Haemophilus ovis-caused, **24**
Heartwater, **37, 38**
Jagziekte, **41**
Liver Fluke, **140**
Meningo-Encephalomyelitis, **163**
Sarcoptic Mange, **141**
Staggers, Plant-caused, **161, 162**
Vibrionic Abortion, **106**
Parasites
Ascaris, **138**
Bilharzia crassa, **93**
Blow-flies, **17, 95**
Coccidium, **90**
Ctenocephalus canis, **64**
Gongylonema, 94
Haemophilus ovis, **24**
Liver Fluke, **63**
Micronematodum ovis n. sp., **94**
Nasal Fly, **16**

Snakes and Serpents
Gnathostomes parasitic to, **13**
Viper, Venom of, Alleged Immunity to, of the Sloughi Dog, **160**

Snoring Disease in Cattle [Madras], 77

Spirillosis of Fowls,
Action in of Acetyloxyaminophenylarsenate of Soda, **4**

Spirochaetosis
Avian
Algerian, and its Preservation in *Argas persicus*, **136**
Greece, **60**
N.S. Wales, Tick-spread, **136**
Canine, **12**
Porcine: Chili, **92**
in Rodents
Rabbit-Susceptibility to *S. crocidurae*, **137**
Spirochaetes
in Blood of
Dogs
Algeria, 60
Argentina, **137**
Horses: Argentina, **60**
Species Named
canina n. sp., Algeria, **60**
crocidurae of the Shrew Mouse, Rabbits Susceptible to, **137**
duttoni and *gallinarum*, Cultivation of, *in vitro*, **13**
theileri-like in Bovines, **13**
Treponema tabacalensis in Argentine Dogs, **137**

Staggers
in Cattle and Sheep, N.S. Wales, Plants Causing, **161, 162**

Strangles
EQUINE, India ; Prevention of, **23**

Swine
Diseases
Anthrax, 21, 102
Coccidiois, **10, 89**
Contagious Abortion, 100
Contagious Pustulous Dermatitis, **107**
Ferula-poisoning, **121**
Foot-and-Mouth, 157
Spirochaetosis, **92**
Tuberculosis, **105**
Parasites : in the Philippines, **16**

Tetanus
EQUINE, Antitetanic Vaccination against, **104** *bis*

Trypanosomiases
GLOSSINA, *see under* **Entomology**
TRYPANOSOMES
Cultivation of, **84**
Dead and Attenuated, Attempts at Immunization with, **130**
Species Named
brucei, Infections by, Experimental ; Treatment, **85**
congolense, Infection by, of Bovines, Action on, of Tryparsamide, 50, **50**
equinum, Cultivation Attempts with, **84**
equiperdum, Biology of, **83**
lewisi, Respiration of, and of *Leishmania tropica*, **2**
pecaudi, **1**
rhodesiense, **50**, **133** *bis*
Infection by, **132**
Treatment, **133**
rodhaini, **49**
schizotrypanum cruzi, 2
soudanense in Camels, **6**
uniforme, 49
vivax : Bechuanaland, **2**
TRYPANOSOMIASES
ANIMAL
BOVINE, **1**
Action in, of Combined Bayer 205, and Antimony, **85**
Nagana, **50**
New Centre of, in Guadeloupe, **129**
Surra, **132**
Treatment by
Bayer 205, **5**
Tryparsamide, **50**
in Camels, **53**
Formol-gel Test used, **6**
due to *T. soudanense* ; Treatment by Bayer 205, **6**
CANINE : Chronic Surra, 127
DOURINE
Blood in, Changes in Physical Properties of, **83**

Trypanosomiases—*cont.*
TRYPANOSOMIASES—*cont.*
ANIMAL—*cont.*
DOURINE—*cont.*
Chemotherapy, **130**
Complement Fixation, **130**
Prophylaxis, **130**
Treatment, Medicinal, **52**
EQUINE
Dourine, **52,** 83
due to *T. pecaudi*, 1
Mal de Caderas, 60
Surra, **84**
Immunization with Dead and Attenuated Trypanosomes, Attempts at, **130**
Incidence, All Forms, in All Animals
Africa, **5**
South and Central, **50**
Argentina, **1,** 60
Dutch East Indies, 129
Java, 127
Sumatra, Samosir District, **132**
Guadeloupe, **129**
Rhodesia, Southern, **1**
Sudan, 50
Zululand, 50, **51**
MAL DE CADERAS, 60
Prophylaxis, Treatment by Bayer 205, **5**
NAGANA
BOVINE, **50**
Experimental, Action in, of Basic Acetyloxyaminophenylarsenate of Soda, **4**
Treatment by
Bayer 205, 85
Tartar Emetic, **51**
Tryparsamide, **50, 51**
SURRA
Biological Contributions to the Problem of, **129**
BOVINE
Prophylactic Treatment in, by Bayer 205, **132**
Transmission Experiments with Tabanidae and *Stomoxys*, **129**
in Camels : Prevention : Treatment, **53**
CANINE, Chronic, 127
EQUINE
India : in the Field, **84**
Transmission Experiments with Tabanidae and *Stomoxys*, **129**
Susceptibility and Resistance to, **130**
Treatment (*see also* Chemotherapy, *supra*), by
Albert 102 : Trypanocidal Properties thereof, **86**
Bayer 205 (Naganol), **5, 6, 50**
and Antimony, **85**
Bismuthoidol, **4, 132**
Medicinal, **52**
Tartar Emetic, **51**
Trypanoléine, van Saceghem's, **1**
Tryparsamide, **50, 51**
Action of, **87**
in Chronic Cases, **87**
EXPERIMENTAL
T. brucei Infection : Treatment, **85**

Trypanosomiases—*cont.*
TRYPANOSOMIASES—*cont.*
HUMAN
African, due to *T. rhodesiense*, **132**, **133** *bis*
Incidence
Katanga, **132**
Rhodesia, **1**, **3**
Sudan, **132**
Serum-Formalin Reaction in, **133**
Treatment by
Bayer 205, **85**, **132**, 133
Stibosan Heyden No. 471, **87**
Tryparsamide, **87**, **133**
American = Chagas's Disease, **2**
in Argentina, **2**

Tuberculosis
BOVINE
Incidence
Annam, **105**
Bamako, **20**
PORCINE : French West Africa, **105**
in Zebras, French West Africa, **105**

Undulant Fever
in Man associated with Bacteria Indistinguishable from *Brucella abortus*, 149

Variola, of Goats, **37**

Vomiting Disease, in Dogs, Batavia, **163**

Wallaby, Bennett's
Sporozoan Parasites in Intestinal Wall of, **88**

Zebras, Tuberculosis in, **105**